AKAI

AS-980

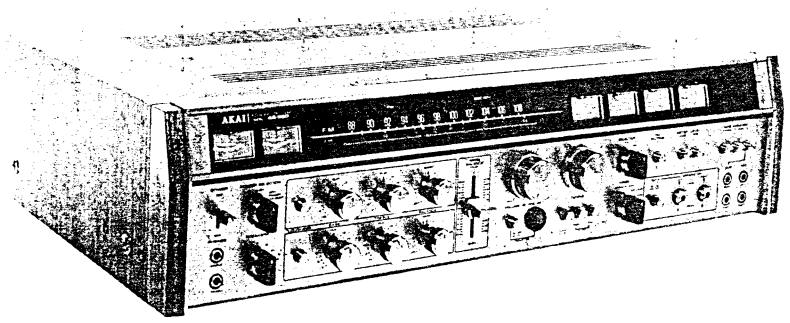
MODEL

SERVICE MANUAL

SERVICE MANUAL
PARTS LIST

AKAI 4-CH/STEREO RECEIVER

MODEL AS-980



4-CH/STEREO RECEIVER

MODEL AS-980

SECTION 1

SERVICE MANUAL

TABLE OF CONTENTS

I. SPECIFICATIONS

An asterisk next to a figure indicates the minimum guaranteed performance.

§ AMPLIFIER SECTION

RATEO OUTPUT	4 CHANNEL	32W at 8Ω (1 ch operation 1 kHz 0.5%)
	2 CHANNEL POWER DOUBLER	50W at 8Ω (1 ch operation 1 kHz 0.5%)
FREQUENCY RESPONSE	PHONO	100 Hz 13±1.5 dB
		10 kHz -13±1.5 dB
	AUX	20 Hz/-2.0 dB 50 kHz/-3.0 dB
POWER BAND WIDTH		10 Hz to 50 kHz at 8Ω
INPUT SENSITIVITY	PHONO	3 mV (-48±1.5 dB)
	MIC	3 mV (-48±1.5 dB)
	AUX	170 mV (-13±1.5 dB)
	TAPE 1, 2	170 mV (-13±1.5 dB)
	TAPE 3	155 mV (-14±1.5 dB)
SIGNAL TO NOISE RATIO	PHONO 1, 2	Better than 35 dB
	MIC	Better than 35 dB
	AUX-DISC 4 CH	Better than 40 dB
	AUX-SQ	Better than 35 dB
	TAPE 1, 2	Better than 40 dB
	TAPE 3	Better than 45 dB
	CD-4	Better than 35 dB (CD-4 Sep. Volume center)
RESIDUAL NOISE		Less than 4.3 mV (Less than -45 dB)
TONE CONTROL	BASS	10±1.5 dB at 100 Hz
		-10.5±1.5 dB at 100 Hz
	TREBLE	10±1.5 dB at 10 kHz
		-10±1.5 dB at 10 kHz
LOUDNESS CONTROL		9±2 dB at 100Hz
		5±2 dB at 10KHz
FILTER	HIGH CUT	-7±1.5 dB at 10kHz
	LOW CUT	-6±1.5 dB at 50 Hz
AUDIO MUTE		-20±2 dB
CROSS TALK		Better than 50 dB
LEFT/RIGHT DEVIATION		Within -3 dB
FRONT/REAR DEVIATION		Within -3 dB
RECORDING OUTPUT	TAPE 1 DIN	34 mV (-27±1.5 dB)
	PIN	170 mV (-13±1.5 dB)
	TAPE 2 PIN	170 mV (-13±1.5 dB)
	TAPE 3 PIN	140 mV (-15±1.5 dB)
DISTORTION FACTOR		Less than 0.1% (8Ω, 10 W output power)

§ SQ SECTION

	Input		F.L	F.R	R.L	R.R
CROSS TALK	F.L	1 kHz	20±2 dBm	Less than -5 dBm	17±2 dBm	17±2 dBm
	F.R	1 kHz	Less than -5 dBm	20±2 dBm	17±2 dBm	17±2 dBm
	F.L+F.R	1 kHz	20±2 dBm	20±2 dBm	-13±2 dBm	13±2 dBm
	F.L-F.R	1 kHz	14±2 dBm	14±2 dBm	20±2 dBm	20±2 dBm
PHASE DEVIATION	F.L	100Hz	0°		90±20°	
	F.L	1 kHz	0°		90±20°	
	F.L	10 kHz	0°		90±20°	
	F.R	100 Hz		0°		-90±20°
	F.R	1 kHz		0°		-90±20°
	F.R	10 kHz		0°		-90±20°

§ RM SECTION

CROSS TALK	F.L	1 kHz	18±2 dBm	7±2 dBm	16±2 dBm	12±2 dBm
	F.R	1 kHz	7±2 dB	18±2 dBm	12±2 dBm	16±2 dB
PHASE DEVIATION	F.L	100 Hz	0°		-90±20°	
	F.L	1 kHz	0°		-90±20°	
	F.L	10 kHz	0°		-90±20°	
	F.R	100 Hz		0°		90±20°
	F.R	1 kHz		0°		90±20°
	F.R	10 kHz		0°		90±20°

§ FM TUNER SECTION

FREQUENCY RANGE		J 75 to 91±1 MHz U 86 to 109±1 MHz
DIAL TRACKING ERROR		±250 kHz
SENSITIVITY (IHF)		1.8 μV *2.8 μV(9 dB)
SENSITIVITY DEVIATION		Within 3 dB
IMAGE REJECTION RATIO		J, U Better than 85 dB
IF REJECTION RATIO		J, U Better than 100 dB
CAPTURE RATIO (IHF)		Less than 1.5 dB
LIMITING SENSITIVITY		Less than 8 dB
MUTING SENSITIVITY		20±3 dB
SELECTIVITY		Better than 80 dB
AM SUPPRESSION RATIO		Better than 45 dB
SIGNAL TO NOISE RATIO		70 dB
	STEREO	*Better than 50 dB
	MONAURAL	*Better than 60 dB
DISTORTION FACTOR	STEREO	0.6% *Less than 1.5%
	MONAURAL	0.2% *Less than 0.5%
FREQUENCY RESPONSE		J -11±1 dB at 10 kHz U -13±1 dB at 10 kHz
STEREO SENSITIVITY		Less than 20 μV (Less than 26 dB)
STEREO INDICATOR SENSITIVITY		Less than 20 μV (Less than 26 dB)
STEREO SEPARATION		40 dB *Better than 35 dB
REJECTION RATIO		Better than 50 dB
LEFT-RIGHT DEVIATION		Within 3 dB
RECORDING OUTPUT	PIN	390 mV (-6±3 dB)
	DIN	70 mV (-21±3 dB)

§ AM TUNER SECTION

FREQUENCY RANGE		525±5 kHz to 1,650±20 kHz
DIAL TRACKING ERROR		Within 2%
SENSITIVITY (IHF)		250 μV (48 dB)
SENSITIVITY DEVIATION		Within 6 dB
IMAGE REJECTION RATIO		80 dB *Better than 60 dB at 1 MHz
IF REJECTION RATIO		75 dB *Better than 60 dB at 1 MHz
SELECTIVITY		35 dB *Better than 30 dB±10 kHz
SIGNAL TO NOISE RATIO		50 dB *Better than 40 dB
DISTORTION FACTOR		0.8% *Less than 1.5%
FREQUENCY RESPONSE		-15 dB at 3 kHz
RECORDING OUTPUT	PIN	140 mV (-15±2 dB)
	DIN	27 mV (-29±2 dB)

§ OTHER

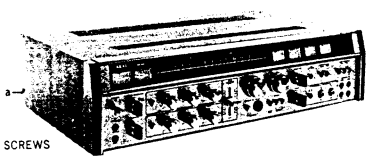
TRANSISTORS	2SA628(E) . . . 5	2SC922(L) . . . 2
	2SA706-3(1)(2) . . . 4	2SC945(P)(Q)(R) . . . 1
	2SA733(Q) (R) . . . 3	2SC1096(K)(L) . . . 1
	2SC458LG(C) . . . 6	2SC1124(1)(2) . . . 8
	2SC711(E)(F) . . . 33	2SC1312(F)(G) . . . 46
	2SC733(P)(Q)(R) . . . 1	2SC1403(O)(Y) . . . 8
	2SC839(H) . . . 4	2SD313(E)(F) . . . 1
	2SC853(L) . . . 1	
FET	2SK30Y(GR) . . . 3	2SK40-2 . . . 4
I.C.	LA1221 . . . 4	TA7122P(A), (B), (C) . . . 4
	LA3300 . . . 1	
DIODES	1N34A . . . 25	YS990 . . . 6
	1N60 . . . 7	FR2-02 . . . 4
	1N4002 . . . 12	HIFI 400V3A . . . 8
	1S188FM . . . 8	WG599 . . . 1
ZENER DIODES	WZ130 . . . 2	ZB1-12 . . . 5
VARISTORS	STV-3H . . . 4	
POWER SOURCE	100 to 240VA.C. 50/60 Hz 120VA.C. 60 Hz (CSA models)	
POWER CONSUMPTION	380W/4Ω (at maximum output) 250W/4Ω (at 1/3 output)	
DIMENSIONS	650(W) x 168 (H) x 426(D) mm (25.6" x 6.6" x 16.8")	
WEIGHT	20.5 kg (45.1 lbs.)	

NOTE: Specifications subject to change without notice.

II. DISMANTLING OF UNIT

In case of trouble, etc. necessitating disassembly, please disassemble in the order shown in photographs. Reassemble in reverse order.

1



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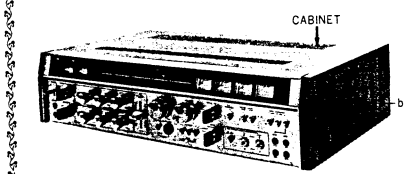

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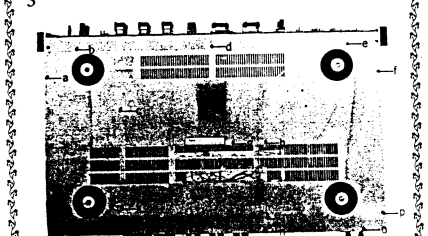

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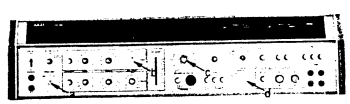

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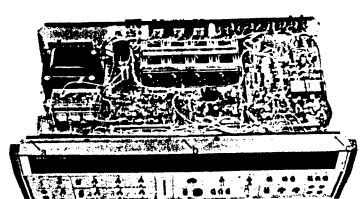


III. ARRANGEMENT OF MAIN PARTS

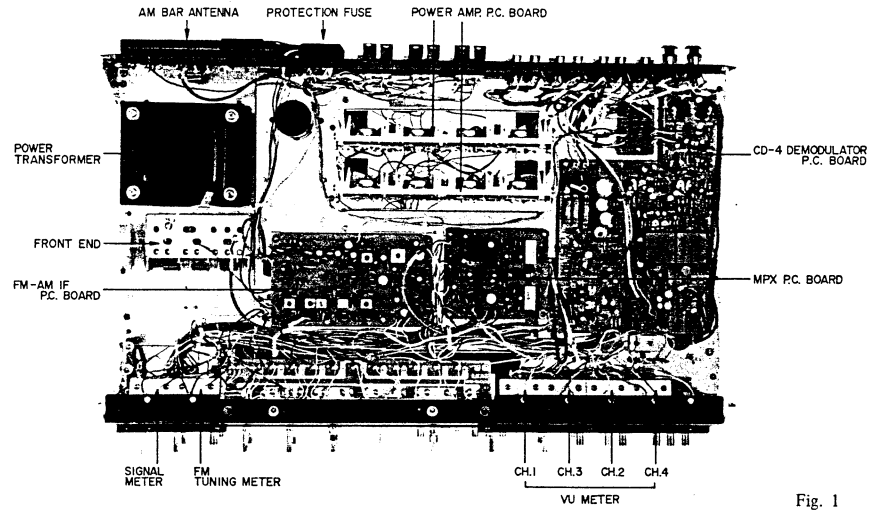


Fig. 1

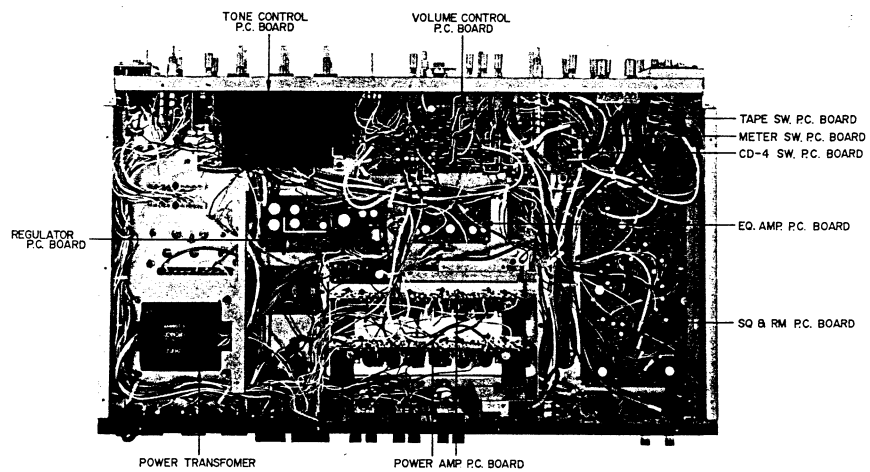


Fig. 2

IV. NECESSARY MEASURING INSTRUMENTS

Measuring Instrument	Model	For
AM-FM Radio IF Genescope	Meguro MSW-721C	FM/AM IF Adjustment
FM Standard Signal Generator	Meguro MSG-278G	FM Tracking, Sensitivity Adjustment
FM Stereo Modulator	Meguro MSG-211E	FM Stereo Separation Adjustment
AM Standard Signal Generator	Meguro MSG-221C	AM Tracking, Sensitivity Adjustment
AM Loop Antenna	Meguro MLA-1001B	AM Tracking, Sensitivity Adjustment
SCA Signal Generator	Meguro MSG-212A	CD-4 Adjustment
Audio Frequency Oscillator	Kikusui 418	CD-4 Adjustment
Attenuator	Kikusui 988-1	CD-4 Adjustment
Oscilloscope	National VP-508A	CD-4 Adjustment
High Sensitivity V.T.V.M.	Kikusui 183E	Tuner/Amp. Section Adjustment
Distortion Meter	Shibasoku 760C	Tuner/Amp. Section Adjustment
Ampere Meter	Yokogawa 2011	Amp. Section Adjustment

Chart 1

V. CLASSIFICATION AND INTERCHANGEABILITY OF VARIOUS P.C. BOARDS

P.C. Board		Model				
		AS-970	AS-960	AA-940	AA-930	AA-920
DIAL ILLUMINATION P.C. BOARD	98-5001	97-5008	97-5008	AA-5029	AA-5029	AA5029
TAPE SWITCH P.C. BOARD	98-5002	97-5004	96-5001			
METER SWITCH P.C. BOA RD	98-5003	97-5001				
CD-4 SWITCH P.C. BOARD	98-5004	97-5003	96-5003			
CD-4 SEPARATION VOL. P.C. BOARD	98-5005					
VOLUME P.C. BOARD	98-5008	98-5006				
TONE CONTROL P.C. BOARD	98-5007	98-5007	96-5006	94-5025	94-5025	92-5010
EQUALIZER AMP. P.C. BOARD	98-5008	98-5008	96-5004	94-5012	94-5012	92-5003
RECT. P.C. BOARD	98-5010	98-5010	98-5010			
LAMP RECT. P.C. BOARD	98-5011	98-5011				
HEADPHONE P.C. BOARD	98-5012	98-5012	98-5012	94-5022	94-5022	94-5022
DUB. P.C. BOARD	98-5013		98-5013			
FILTER & REMOTE P.C. BOARD	98-5014A,B					
SQ AMP. P.C. BOARD	98-5015	97-5010	97-5010			
LOUDNESS SWITCH P.C. BOARD	98-5016		96-5005			
MIC P.C. BOARD	98-5059		95-5059	94-5021	94-5021	94-5021
RESISTOR P.C. BOARD	98-5060					
REGULATOR P.C. BOARD	98-5084	98-5084*	98-5084*			
CD-4 DEMODULATOR P.C. BOARD	TDM-7					
MPX. P.C. BOARD	94-5008	94-5008*	91-5033	94-5008	94-5008	94-5008
FM-AM IF P.C. BOARD	94-5009	94-5009*	91-5033	94-5009	94-5009	94-5009
POWER AMP. P.C. BOARD	92-5005	97-5009	96-5008	94-5013	94-5013	92-5005

Chart 2

NOTE: * . . . No Interchangeable

VI. FM TUNER SECTION ADJUSTMENTS

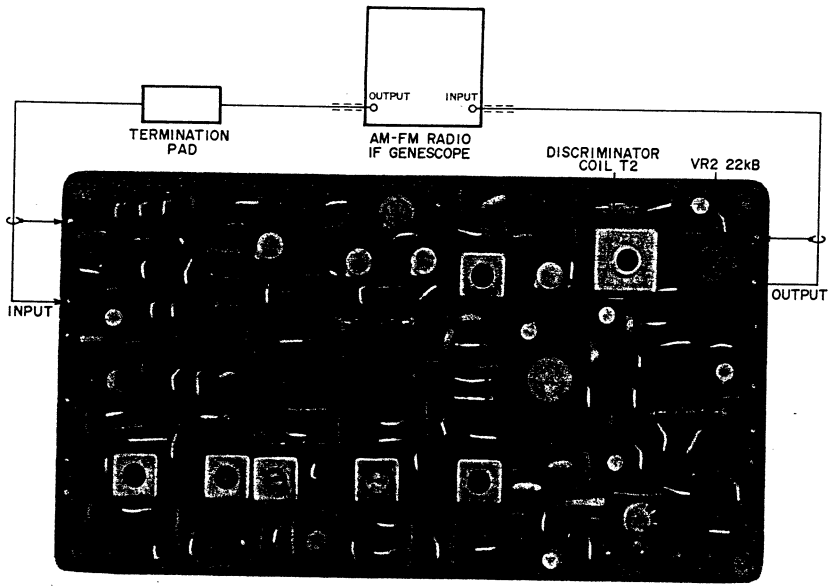


Fig. 3 INSTRUMENT CONNECTIONS

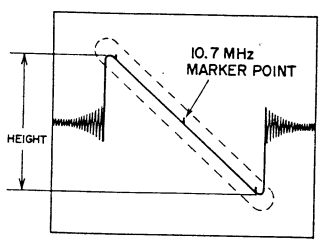


Fig. 4

Vertical Gain	0.3Vp-p to 1 cm
GENESCO Output Level	50 dB
Discriminator Coil	T2
S Curve Height	5 cm

Chart 3

1. FM IF CIRCUIT ADJUSTMENT

1) Connect the lead wires from an AM-FM Radio IF GENESCOPE (hereinafter referred to as GENESCO) to the input as well as the output of the FM-AM IF P.C. Board as shown in Fig. 3.
2) Set GENESCO to FM mode and adjust vertical gain (refer to Chart 3).
3) Set Receiver SELECTOR to FM AUTO, and tuning indicator needle to extreme right end of the dial. At this time confirm that a noise element does not enter the S Curve shown in Fig. 4.
4) Adjust output level of GENESCO (refer to Chart 3).
5) Manually center FM-AM IF P.C. Board semi-fixed resistor VR2 22 kB.
6) Adjust the upper and lower cores of Discriminator Coil so that the wave height value of the S Curve shown in Fig. 4 is maximum and the linearity of the part indicated by the dotted line is optimum. (Refer to Fig. 4 and Chart 3)

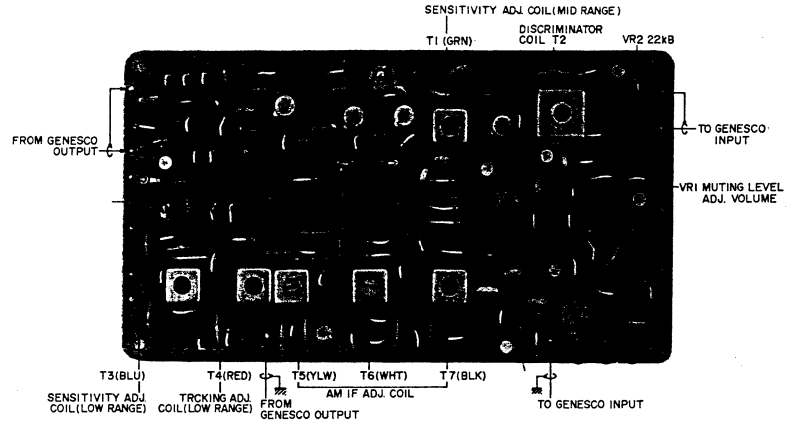


Fig. 5 FM-AM IF P.C. BOARD 94-5009

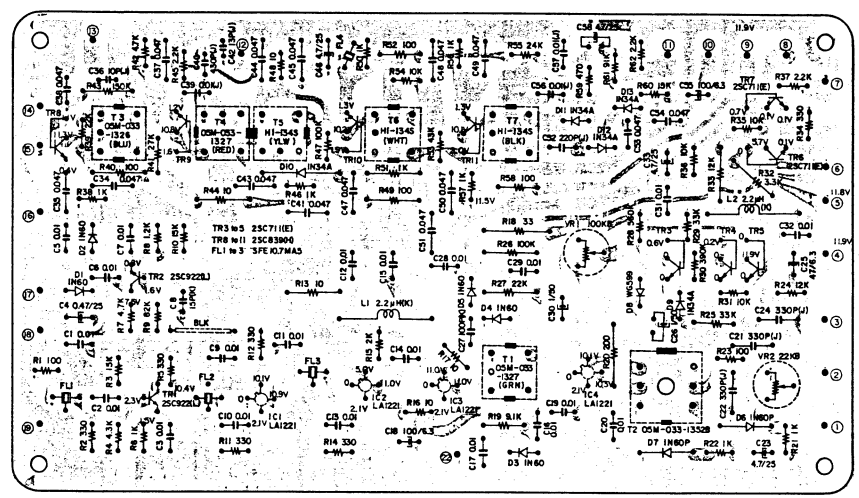
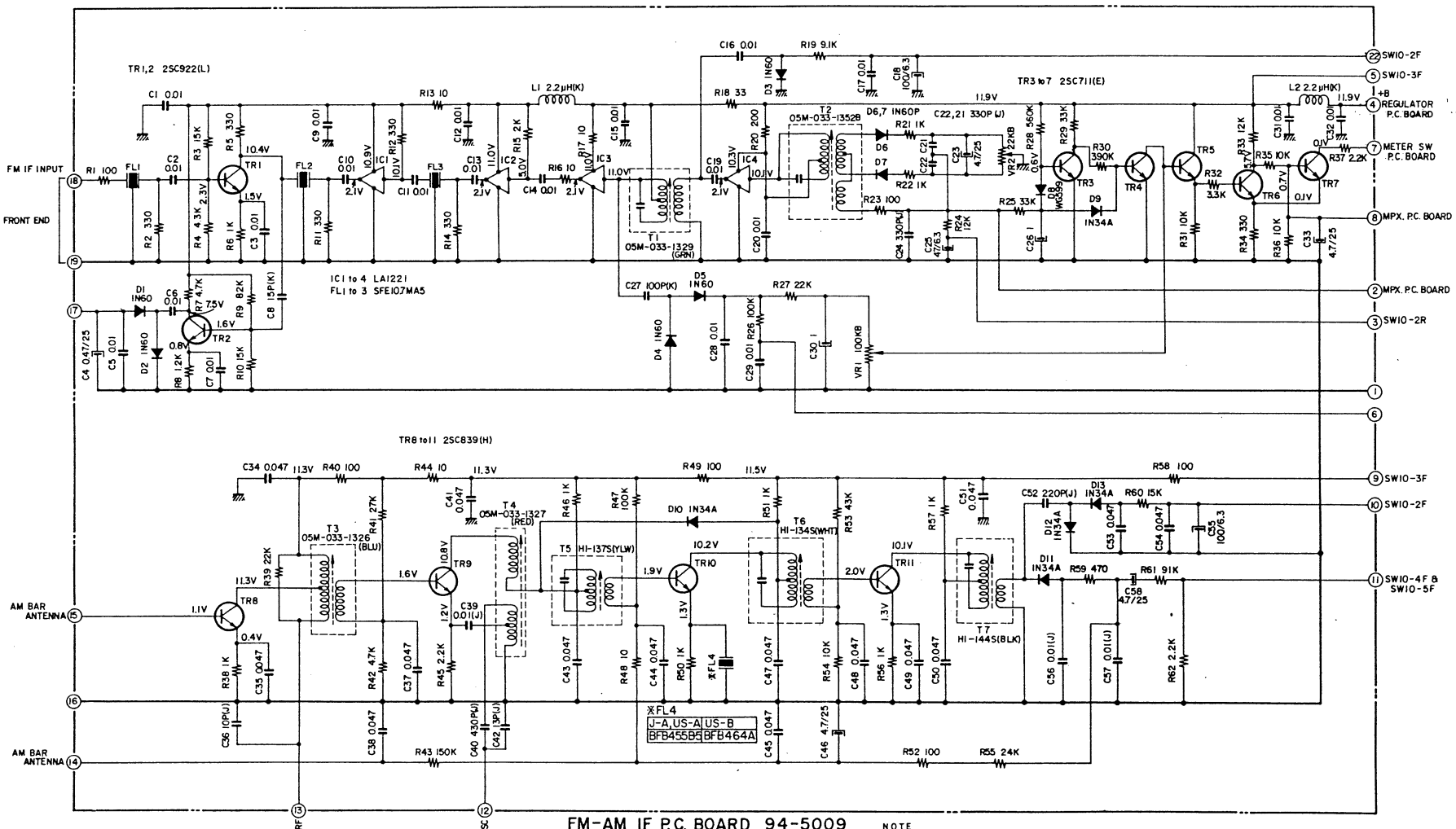


Fig. 6 FM-AM IF P.C. BOARD 94-5009 (Rev.)


TR1,2 2SC922(L)
FM IF INPUT
FRONT END
IC1 to 4 LA1221
FL1 to 3 SFE10.7MA5
T1 05M-033-1329 (GRN)
T2 05M-033-1352B
D6,7 1N60P
C22,21 330P(J)
TR3 to 7 2SC711(E)
L1 2.2μH(K)
L2 2.2μH(K)
+B
REGULATOR P.C. BOARD
METER SW P.C. BOARD
MPX. P.C. BOARD
MPX. P.C. BOARD
SW10-2R
SW10-3F
SW10-2F
SW10-4F & SW10-5F
SW10-3F
SW10-2F
SW10-2F
SW10-3F
TR8 to 11 2SC839(H)
T3 05M-033-1326 (BLU)
T4 05M-033-1327 (RED)
T5 HI-137S(YLW)
T6 HI-134S(WHT)
T7 HI-144S(BLK)
AM BAR ANTENNA
AM BAR ANTENNA
RF
OSC
※FL4
J-A,US-A US-B
BFB455B BFB464A
FM-AM IF P.C. BOARD 94-5009
NOTE
UNLESS OTHERWISE SPECIFIED
ALL RESISTORS IN Ω 1/4W(J)
ALL CAPACITORS IN μF 50W.V.(Z)

SCHEMATIC 1

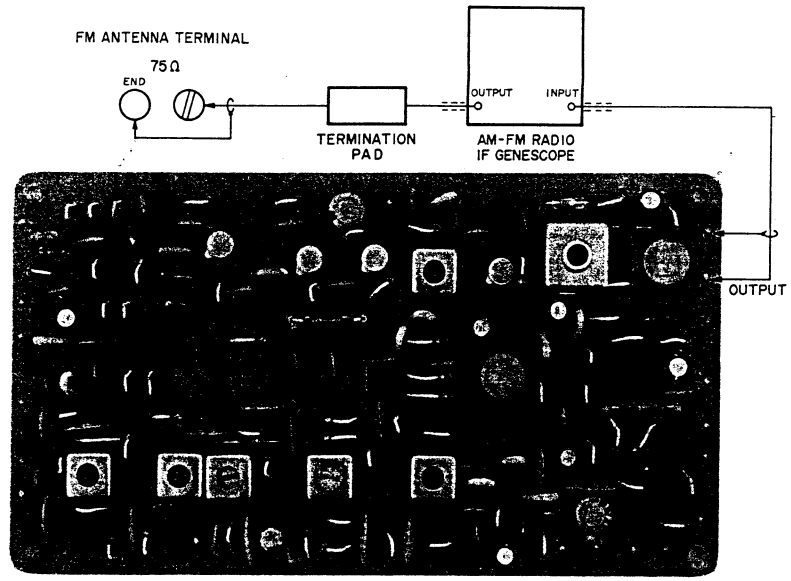


Fig. 7 INSTRUMENT CONNECTIONS

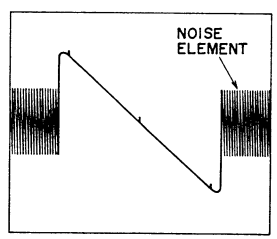


Fig. 8

2. FRONT END AND FM IF MATCHING ADJUSTMENT

1) Connect the GENESCO lead wires to the 75Ω FM ANTENNA TERMINALS of the Receiver as well as to the FM IF P.C. Board output as shown in Fig. 7.
2) Set the GENESCO to FM mode and adjust the vertical gain of GENESCO to obtain a 10 mm amplitude of the 0.3Vp-p calibration voltage on GENESCO Screen and set the GENESCO attenuator to 100 dB.
3) Set Receiver SELECTOR to FM AUTO, and tuning indicator needle to extreme right end of the dial.
4) Adjust the upper core of Front End IF Coil (see Fig. 18) to obtain maximum wave height value of S Curve in Fig. 8, and adjust the lower core to obtain maximum noise level.
5) Make this adjustment again following FM Sensitivity Adjustment.

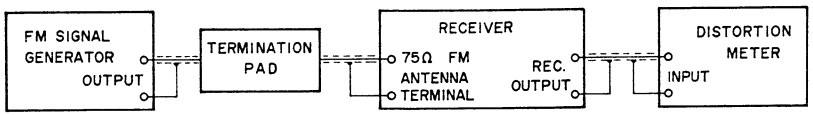
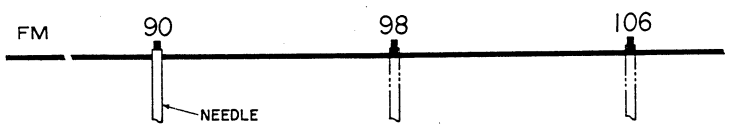


Fig. 9 INSTRUMENT CONNECTIONS



Ref. In making Tracking Adjustments, set dial to following positions. Fig. 10

FM S.G. Output	40 dB
Core (Low Range)	Lo
Trimmer Condenser (High Range)	TCo

Chart 4

Core (Low Range)	LR2, LR1, LA
Trimmer Condenser (High Range)	TCR2, TCR1, TCA
IF Coil (Mid Range)	IF
Discriminator Coil (Mid Range)	T2

Chart 5

3. TRACKING ADJUSTMENT

1) Connect the various measuring instruments as shown in Fig. 9.
2) Set the oscillation frequency of the FM SIGNAL GENERATOR (hereinafter referred to FM S.G.) to 90 MHz (400 Hz 100% internal modulation), and set the output of the FM S.G. to 46 dB. (Refer to Chart 4)
3) Set Receiver SLECTOR to FM AUTO, and tuning indicator needle to 90 MHz. (Refer to Fig. 10)
4) Adjust Core Lo of Front End (Fig. 18) until the distortion meter level is maximum and the distortion factor is minimum. (Refer to Chart 4)
5) Set the oscillation frequency of FM S.G. and tuning indicator needle to 106 MHz. (Refer to Fig. 10)
6) Adjust timmer condenser TCo of Front End (Fig. 18) until the distortion meter level is maximum and the distortion factor is minimum. (Refer to Chart 4)

4. SENSITIVITY ADJUSTMENT

1) Carry out these adjustments after the previously described Tracking Adjustments have been completed.
2) Measuring instrument connections are the same as described in Tracking Adjustments.
3) Set the oscillation frequency of the FM S.G. to 90 MHz (400 Hz, 100% internal modulation), set Receiver SELECTOR to FM AUTO, and set the tuning indicator needle to 90 MHz. (Refer to Fig. 10)
4) Adjust the FM S.G. Attenuator to obtain a 3% distortion factor.
5) Adjust the cores of Front End (Fig. 18) until the distortion meter level is maximum and the distortion factor is minimum. (Refer to Chart 5)
6) Set the oscillation frequency of FM S.G. and tuning indicator needle to 106 MHz. (Refer to Fig. 10)
7) Adjust the FM S.G. Attenuator to obtain a 3% distortion factor.
8) Adjust Trimmer Condensers of Front End (Fig. 18) until the distortion meter level is maximum and the distortion factor is minimum. (Refer to Chart 5)

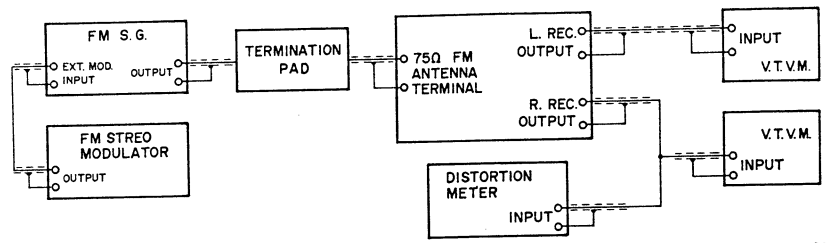


Fig. 11 INSTRUMENT CONNECTIONS

9) Set the oscillation frequency of FM S.G. and the tuning indicator needle to 98 MHz. (Refer to Fig. 10)
10) Adjust the FM S.G. Attenuator to obtain a 3% distortion factor.
11) Adjust the upper and lower cores of IF Coil in Front End (Fig. 18) and the lower core of FM-AM IF P.C. Board Discriminator Coil until the distortion meter level is maximum and the distortion factor is minimum. (Refer to Chart 5)
12) Repeat adjustments outlined in Items 3) through 11) at 90 MHz, 98 MHz and 106 MHz two or three times for highest sensitivity.

5. SIGNAL METER SENSITIVITY ADJUSTMENT

1) Supply a 98 MHz (400 Hz, 100% internal modulation) 60 dB signal to the Receiver from the FM S.G. Alignment is attained when the tuning meter indicator comes to the exact center of the meter.
2) Under the above conditions, adjust the core of Coil T1(GRN) of FM-AM IF Amp. P.C. Board to obtain maximum signal meter indication.

6. STEREO SEPARATION ADJUSTMENT

1) Connect the various measuring instruments as shown in Fig. 11.
2) Set the FM STEREO MODULATOR pilot signal 19 kHz to 10%, and the main signal 400 Hz (left channel+right channel) to 90% modulation, and supply this composite signal (ratio 9:1) to the EXT MOD. input terminal of the FM S.G.
3) Set the FM S.G. oscillation frequency to 98 MHz, and the Attenuator to 66 dB.
4) Set Receiver SELECTOR to FM AUTO; and the tuning indicator needle to 98 MHz to receive the FM S.G. Signal.
5) Set the output signal selector of FM STEREO MODULATOR to SUB.
6) Adjust the cores of MPX P.C. Board 19 kHz Filter L1(BLK), and 38 kHz Filter L2(WHT) until the distortion factor is minimum. (Refer to Fig. 12)
7) Set the output signal selector of FM STEREO MODULATOR to left channel.
8) Adjust the MPX Adjustment Volume located on rear panel of the Receiver until the right channel output level is minimum.

7. TUNING METER CENTER ADJUSTMENT

After completing the adjustments outlined in Parts 1 through 4 of this manual, set the FM S.G. Attenuator to non-output condition, and adjust the upper core of FM-AM IF P.C. Board Discriminator Coil T2 shown in Fig. 5 until the tuning indicator needle of tuning meter comes to the center.
Then set Receiver dial to 98 MHz, supply a 98 MHz (400 Hz, 100% internal modulation) 66 dB signal from the FM S.G., and fine adjust the lower core of Discriminator Coil T2 for minimum distortion factor.

8. MUTING LEVEL ADJUSTMENT (STEREO INDICATOR SENSITIVITY ADJUSTMENT)

1) Connect the various measuring instruments as shown in Fig. 11.
2) Set the FM S.G. oscillation frequency to 98 MHz (400 Hz 100% internal modulation) and Attenuator to non-output condition.
3) Set receiver dial to 98 MHz.
4) Adjust FM-AM IF P.C. Board semi-fixed resistor VR1 68 kB so that when the attenuation decreases and the Attenuator scale is at 26 dB, signal output is emitted at both channels.

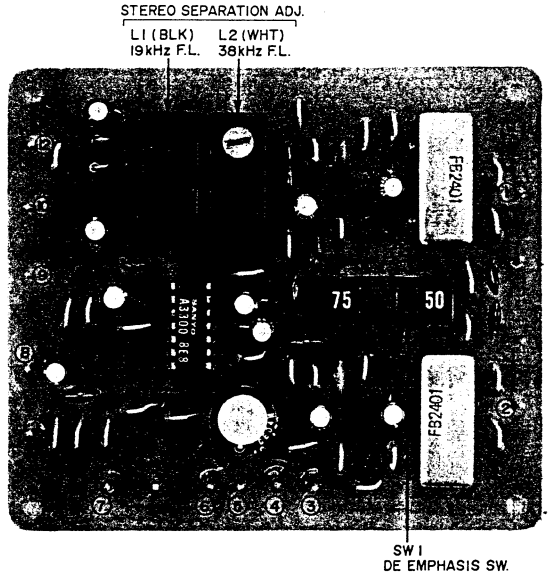


Fig. 12 MPX P.C. BOARD 94-5008

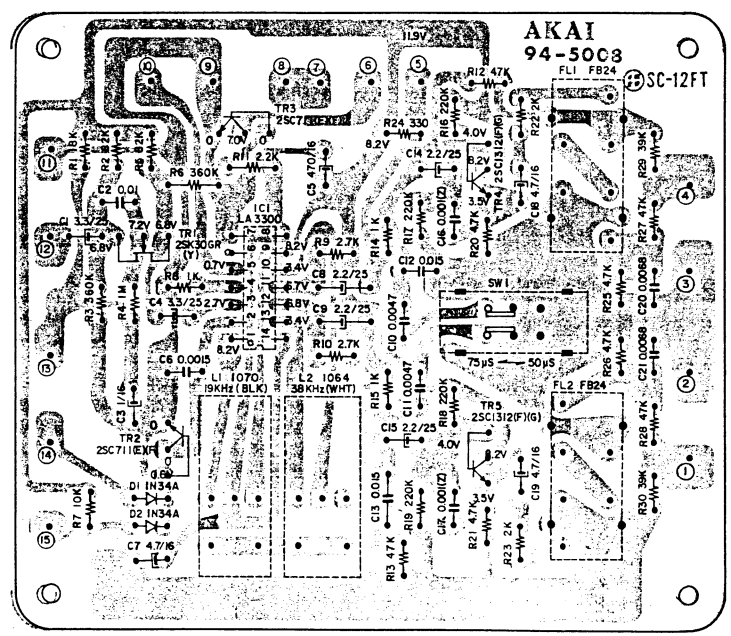
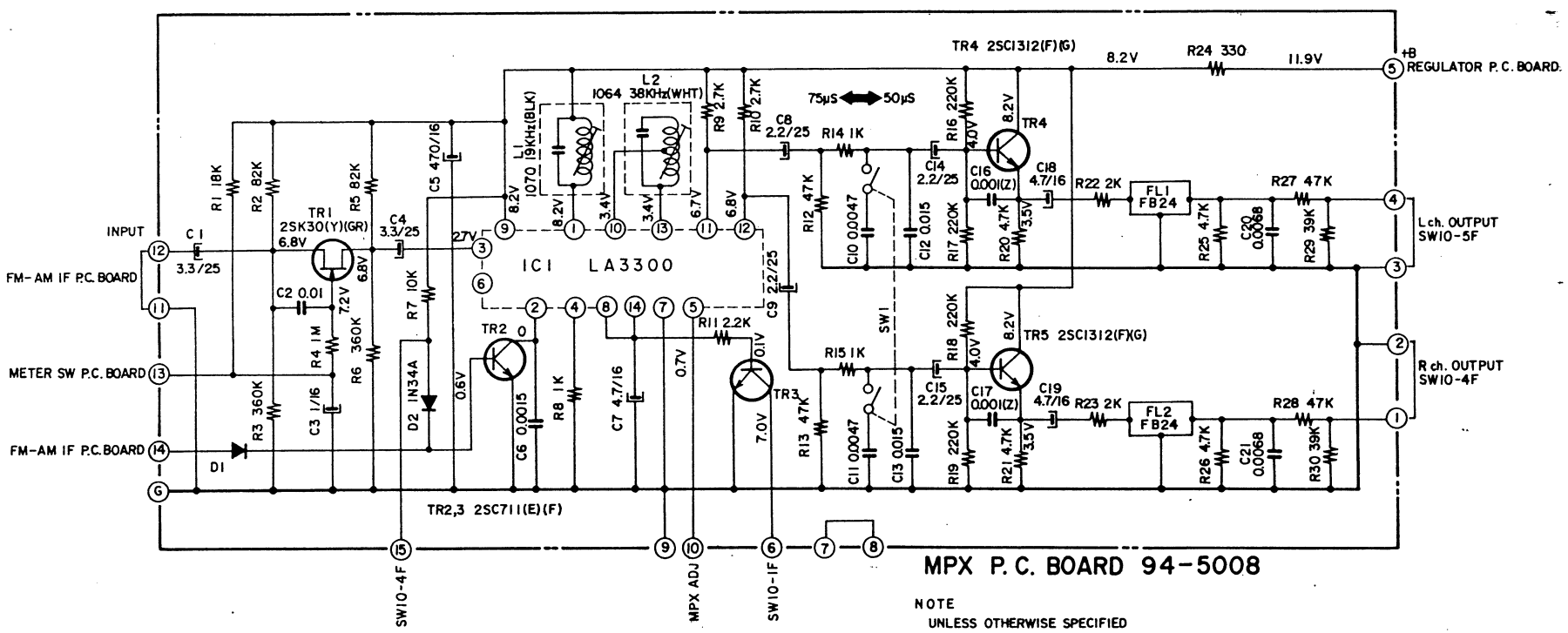


Fig. 13 MPX P.C. BOARD 94-5008 (Rev.)


INPUT
FM-AM IF P.C. BOARD
METER SW P.C. BOARD
FM-AM IF P.C. BOARD
R1 18K
R2 82K
R3 360K
R4 1M
R5 82K
R6 360K
R7 10K
R8 1K
C1 3.3/25
C2 0.01
C3 1/16
C4 3.3/25
C5 470/16
C6 0.0015
C7 4.7/16
C8 2.2/25
C9 2.2/25
C10 0.0047
C11 0.0047
C12 0.015
C13 0.015
C14 2.2/25
C15 2.2/25
C16 0.001(Z)
C17 0.001(Z)
C18 4.7/16
C19 4.7/16
C20 0.0068
C21 0.0068
TR1 2SK30(Y)(GR)
TR2 0
TR3
TR4 2SC1312(F)(G)
TR5 2SC1312(F)(G)
TR2,3 2SC711(E)(F)
D1
D2 1N34A
L1 1070 19KHz(BLK)
L2 1064 38KHz(WHT)
IC1 LA3300
SW1
75μS ⟷ 50μS
R9 2.7K
R10 2.7K
R11 2.2K
R12 47K
R13 47K
R14 1K
R15 1K
R16 220K
R17 220K
R18 220K
R19 220K
R20 4.7K
R21 4.7K
R22 2K
R23 2K
R24 330
R25 4.7K
R26 4.7K
R27 47K
R28 47K
R29 39K
R30 39K
FL1 FB24
FL2 FB24
8.2V
11.9V
+B
REGULATOR P.C. BOARD.
L ch. OUTPUT
SW10-5F
R ch. OUTPUT
SW10-4F
SW10-4F
MPX ADJ
SW10-IF
MPX P.C. BOARD 94-5008
NOTE
UNLESS OTHERWISE SPECIFIED
ALL RESISTORS IN Ω 1/4W (J)
ALL CAPACITORS IN μF 50W.V.(J)

SCHEMATIC 2

VII. AM TUNER SECTION ADJUSTMENTS

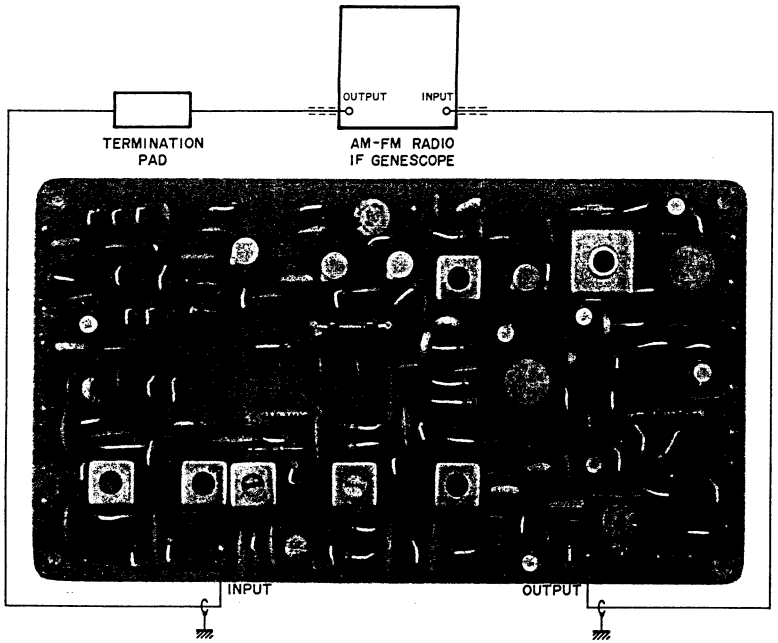


Fig. 14 INSTRUMENT CONNECTIONS

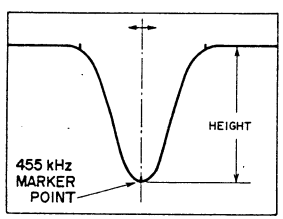


Fig. 15

Vertical Gain	0.3Vp-p to 1 cm
GENESCO Output Level	60 dB
Single Peaked Curve Height	4 cm

Chart 6

1. AM IF CIRCUIT ADJUSTMENT

1) Connect the AM-FM Radio IF GENESCOPE (hereinafter referred to as GENESCO) lead wires to input terminal as well as output terminal of the FM-AM IF P.C. Board as shown in Fig. 14.
2) Set GENESCO to AM mode and adjust vertical gain. (Refer to Chart 6)
3) Set Receiver SELECTOR to AM and set the tuning indicator needle to extreme right end of the dial.

NOTE: A noise element should not enter the single peaked curve shown in Fig. 15.

4) Adjust output level of GENESCO. (Refer to Chart 6)
5) Adjust the cores of FM-AM IF P.C. Board IFT T7(BLK) (refer to Fig. 5) so that the 455 kHz marker point of the single peaked curve displays maximum amplitude as shown in Fig. 15.
6) Adjust the cores of FM-AM IF P.C. Board IFT T6(WHT) and T5(YLW) (refer to Fig. 5) so that the left and right rise up characteristics of the single peaked curve shown in Fig. 15 are identical from the center (indicated by the dotted line in the figure).
7) In marking this adjustment the single peaked curve marker point will differ according to the rank of the ceramic filter.

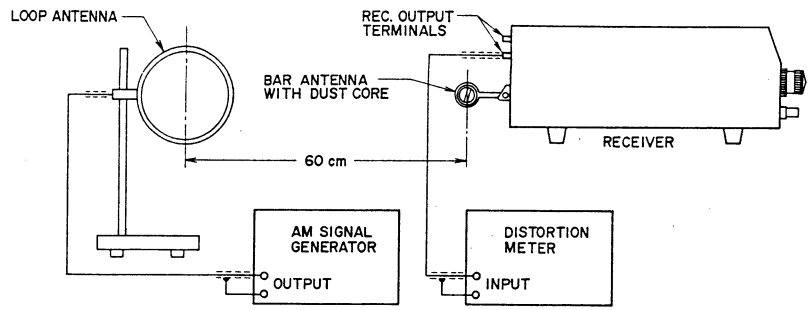
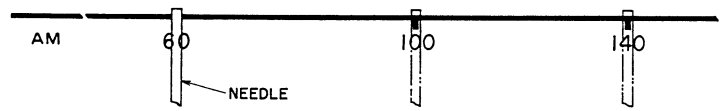


Fig. 16 INSTRUMENT CONNECTIONS



Ref. In making Tracking Adjustments, set dial to following positions. Fig. 17

AM S.G. Output	60 dB
Core (Low Range)	T4
Trimmer Condenser (High Range)	TC1

Chart 7

Bar Antenna Dust Core (Low Range)	Fig. 16
Trimmer Condenser (High Range)	TC2, TC3
RF Coil (Mid Range)	T3

Chart 8

2. TRACKING ADJUSTMENT

1) Connect the various measuring instruments as shown in Fig. 16.
2) Set the oscillation frequency of the AM SIGNAL GENERATOR (hereinafter referred to as AM S.G.) to 600 kHz (400 Hz 30% internal modulation) and adjust the AM S.G. Attenuator. (Refer to Chart 7)
3) Set Receiver SELECTOR to AM and tuning indicator needle to 600 kHz. (Refer to Fig. 17)
4) Adjust the core of FM-AM IF P.C. Board Tracking Adjustment Coil T4(RED) in Fig. 5 until the distortion meter level is maximum and the distortion factor is minimum.
5) Set the oscillation frequency of AM S.G. and tuning indicator needle of Receiver to 1,400 kHz. (Refer to Fig. 17)
6) Adjust Front End Trimmer Condenser in Fig. 18 until the distortion meter level is maximum and the distortion factor is minimum. (Refer to Chart 7)
7) Repeat adjustments outlined in Items 2) through 6) two or three times for minimum tracking error.

3. SENSITIVITY ADJUSTMENT

1) Carry out these adjustments after the previously described Tracking Adjustments have been completed.
2) Measuring instrument connections are the same as described in Tracking-Adjustments. (Refer to Fig. 16)
3) Set the oscillation frequency of the AM S.G. to 600 kHz (400 Hz 30% internal modulation). Set Receiver SELECTOR to AM and the tuning indicator needle to 600 kHz. (Refer to Fig. 17)
4) Adjust AM S.G. Attenuator to obtain a 10% distortion factor.
5) Adjust dust core of Bar Antenna shown in Fig. 16 until the distortion meter level is maximum and the distortion factor is minimum.
6) Set the oscillation frequency of AM S.G. and tuning indicator needle of Receiver to 1,400 kHz. (Refer to Fig. 17)
7) Adjust AM S.G. Attenuator to obtain a 10% distortion factor.
8) Adjust Front End trimmer condensers in Fig. 18 until the distortion meter level is maximum and the distortion factor is minimum. (Refer to Chart 8)

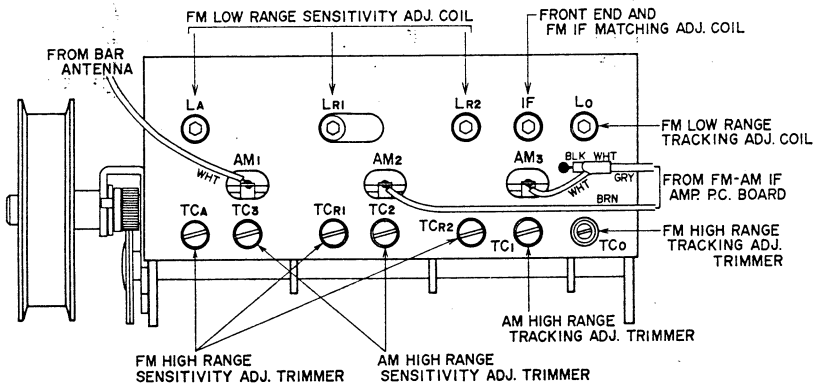


Fig. 18

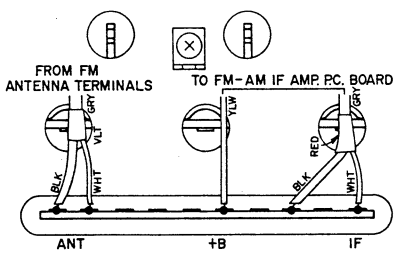


Fig. 19

9) Set the oscillation frequency of Am S.G. and tuning indicator needle of Receiver to 1,000 kHz. (Refer to Fig. 17)
10) Adjust AM S.G. Attenuator to obtain a 10% distortion factor.
11) Adjust the core of FM-AM LF P.C. Board Coil T3(BLU) (refer to Fig. 5) until the distortion meter level is maximum and the distortion factor is minimum.
12) Repeat adjustment outlined in Items 3) through 11) at 600 kHz, 1,000 kHz and 1,400 kHz two or three times for highest sensitivity.

VIII. TUNING CORD THREADING

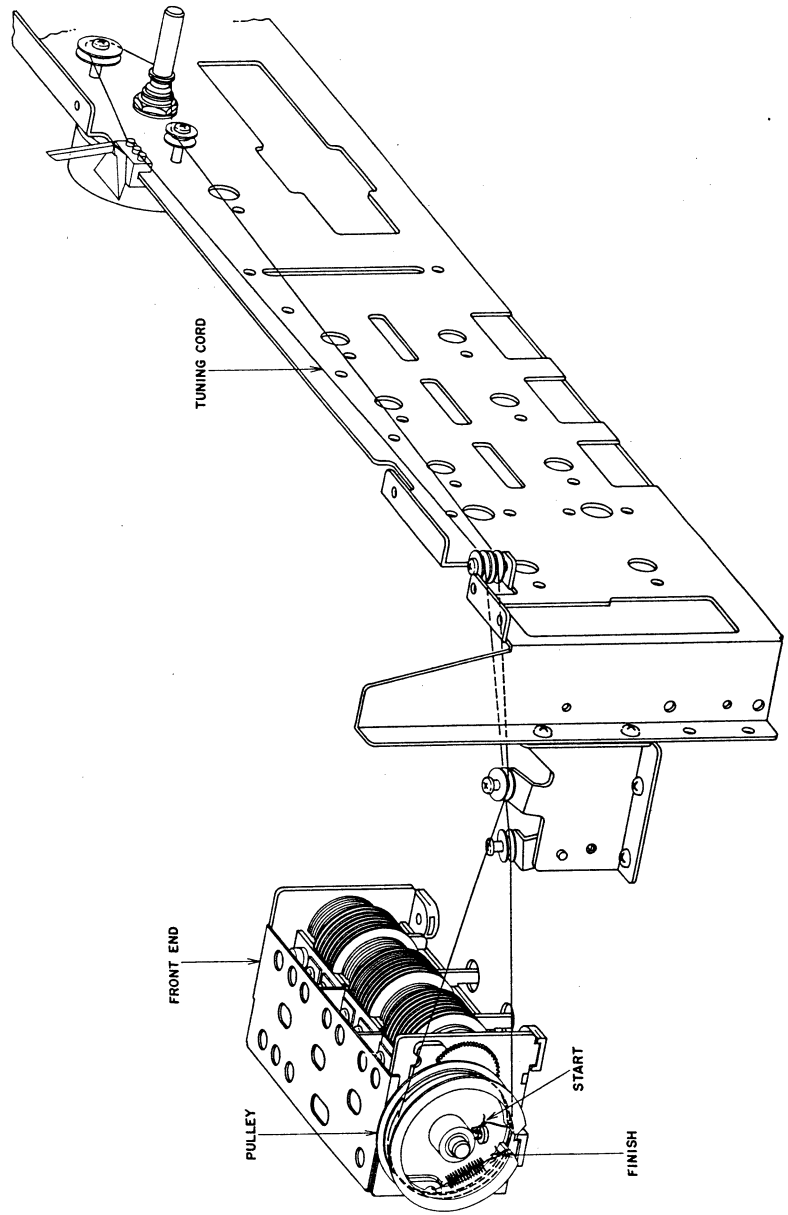


Fig. 20

IX. CD-4 ADJUSTMENTS

1. SERVICING AND ADJUSTING THE CD-4 DEMODULATOR

There are two ways to provide the signals for testing a CD-4 demodulator: either using a purely electrical signal generator or using a test record. When testing the measurements will be influenced by the mechanical vibration system of the cartridge stylus assembly, this will reduce the accuracy of your measurements. To precisely measure the performance of a demodulator you must use a standard signal source such as an SCA signal generator or an audio signal generator. When carrying out repairs or replacements or when checking the demodulator's characteristics roughly, it will be convenient to use a test record.

1) Adjusting Instruments

a) Audio oscillator: 20 Hz-50 kHz

b) SCA signal generator: Meguro's MSG212A, etc. (replaceable with a test record)

c) Oscilloscope: input impedance of more than 500 kΩ; frequency band width of wider than DC-100 kHz.

d) AC voltmeter: input impedance of 1 MΩ; -60 dB readable (AC millivoltmeter)

e) Attenuator: frequencies, higher than 100 kHz

f) Test record: RG1256/1257

2) Specifications of Test Record

RG1256 (33-1/3 rpm)	
Band 1 CH1 Warble tone Band 2 CH2 Warble tone Band 3 CH3 Warble tone Band 4 CH4 Warble tone	Warble tone of each channel is used for adjusting and checking channel crosstalk.
Band 5 Channel announcement	Each channel announcement and 700 Hz signals are repeated in the order CH1 to CH4 to identify the channel.
Band 6 CH1 + CH3 700 Hz	FRONT centering signal
Band 7 CH2 + CH4 700 Hz	REAR centering signal
Band 8 Difference signal	700 Hz reference signal (0 VU) Only the difference signal is in-phase for right and left channels, and used for setting the input level into the ANRS expander.
Band 9 30 kHz unmodulated carrier	Only the carrier is cut on the innermost grooves on the record and used for checking the operation of the demodulating circuit.
RG1257 (33-1/3 rpm)	
Band 1 CH + CH3 Frequency signals spot	Signals for checking the rough frequency characteristic.
Band 2 CH2 + CH4 Frequency signals spot	Spot frequencies are as follows: 1k, Break, 12k, 10k, 8k, 6k, 4k, 2k, Break, 1k, 700 Hz, 400Hz, 200 Hz, Break, 100 Hz, 70 Hz, 50 Hz and 30 Hz
Band 3 Difference signal	700 Hz reference signal (0 VU) Same as RG1256 Band 8
Band 4 Difference signal 400 Hz 4 kHz modulation (L+R) Band 5 Difference signal 400 Hz 8 kHz modulation (L+R)	Signals for testing the 30 kHz carrier level.

Measuring point		Representative measured value (0 dB=0.775V)			
(L)	(R)	100 Hz	1 kHz	10 Hz	30 kHz
TP109	TP110	+6 dBs	-6 dBs	-7 dBs	-7 dBs

Chart 9

Cartridge	Measuring point		Representative measured value (0 dB=0.775V)				Remarks
	(L)	(R)	100 Hz	1 kHz	10 Hz	30 kHz	
4MD-10X	TP111	TP112	-40 dBs	-40 dBs	-28 dBs		
	TP109	TP110				-20 dBs	Large error
4MD-20X	TP111	TP112	-38 dBs	-38 dBs	-26 dBs		
	TP109	TP110				22 dBs	Large error

Chart 10

3) Checking 1/2 Equalizer Characteristics

Characteristics of the 1/2 equalizer can be checked with either an audio oscillator or test record. The audio oscillator is recommended for a precise testing.

a) Checking with Audio Oscillator
Signal application point, PHONO INPUT
Signal application level -40 dBs

b) Checking with Test Record
Test Record: RG1257 Band 1 or Band 2 (100, 1k, 10 kHz) and RG1256 Band 9 (30 kHz)
Cartridge: 4MD-10X or 4MD-20X

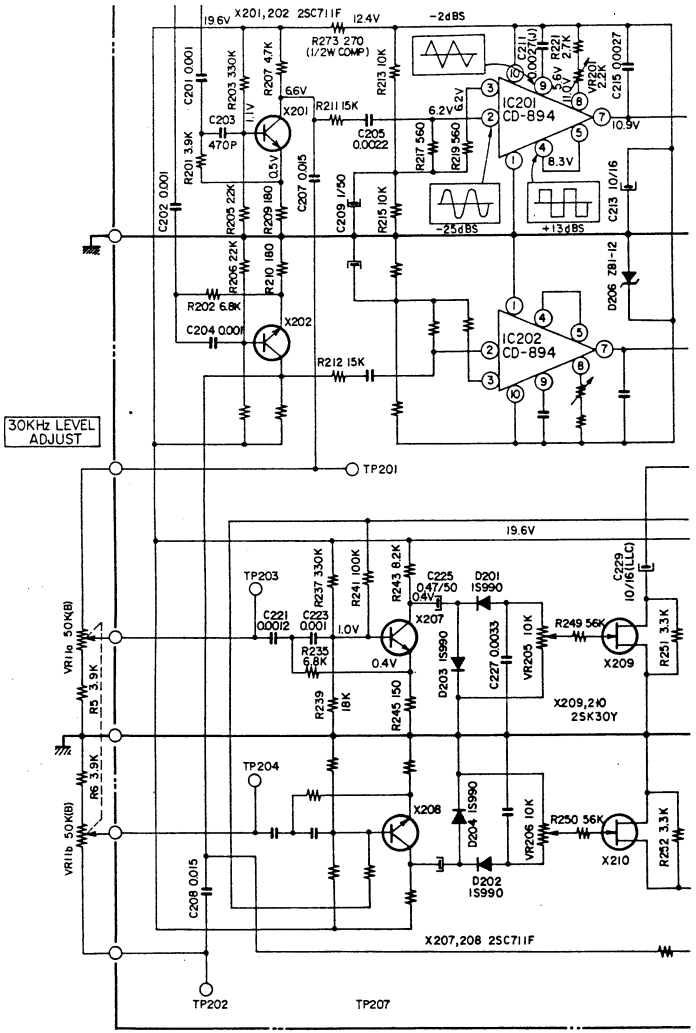
NOTE: 1. When the test record method is used, the measured values vary to some extent depending upon the cartridge used. Especially the errors in measured values at 10 kHz and 30 kHz will be large.
2. If the measured values are entirely different from the above listed representative values, there is probably something wrong with the transistors or ICs, or disconnecting or shorting of the wires. If the measured values are different at specific frequencies, the NF circuit is suspect.

4) Checking the Characteristics of the 2/2 Equalizer and Operation Circuit

a) Checking with Audio Oscillator.
Signal application level, -40 dBs.

b) Checking with Test Record
When this method is used the 1/2 equalizer must operate normally. Therefore the equalizer must be checked in advance according to the method described in 3). The same test records are used as in 3)-b).

NOTE: 1. Since the measured values vary depending upon the cartridge used, the variation at 100 Hz and 10 kHz compared to that at 1 KHz must be checked.
2. The separation tuning VR refers to the "CD-4 Adjust" screws on the front panel of the receiver.



SCHEMATIC 3

Signal application point		Measuring point		Representative measured value (0 dB=0.775V)			Remarks
(L)	(R)	(L)	(R)	100 Hz	1 kHz	10 kHz	
TP111	TP112	TP115 (CH1 OUT)	TP116 (CH3 OUT)	-16 dBs	-17 dBs	-30 dBs	The separation tuning VR is set to max.

Chart 11

Cartridge	Measuring point		Representative measured value (0 dB=0.775V)			Remarks
	(L)	(R)	100 Hz	1 kHz	10 kHz	
4MD-10X	TP115	TP116	-14 dBs	-14 dBs	-14 dBs	The separation tuning VR is set to max.
4MD-20X			-12 dBs	-12 dBs	-12 dBs	

Chart 12

5) Checking the Demodulation Circuit

The demodulation circuit is checked by the wave form developed when the 30 kHz signal (Audio oscillator or test record RG1256 Band 9) is applied.

a) Adjusting the VCO

The various wave forms shown in SCHEMATIC–3 are generated when a -50 dBs, 30 kHz signal is applied to the PHONO terminal. The wave forms at various sections are almost the same when test record RG1256 Band 9 is played using cartridge 4MD-10X or 4MD-20X.

The free-running frequency of PLL IC CD-894 must be adjusted correctly to 30 kHz. When the IC and its peripheral circuit is repaired, it is necessary that the free-running frequency be readjusted correctly. The adjustment is done in accordance with the so-called zero beat method. An accurate 30 kHz signal (Audio oscillator or test record RG1256 Band 9) is applied to the PHONO terminal so that the beat between this 30 kHz signal and the free-running frequency can be detected and reduced to zero. When the input is large, the locking range of the PLL is wide so that adjustment becomes impossible.

Therefore the PHONO input is attenuated to -110 dBs or so. Output is possible at any stage after the LPF(F201), but it will be easier if the adjustment is done while listening to the beats through an earphone (Fig. 21). In this case it is necessary that the muting circuit be kept OFF. (See Note in 1–6))

When adjustment is done using test records, attenuating the input is complicated. For example, when test record Band 9 is played by using a 2 channel stylus, the 30 kHz signal will be attenuated and the adjustment can be achieved easily by making a gap between the stylus and the cartridge body as shown in Fig. 22, by not inserting the stylus fully into the cartridge body. In this case the muting circuit must also be kept OFF.

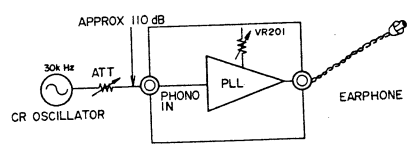


Fig. 21

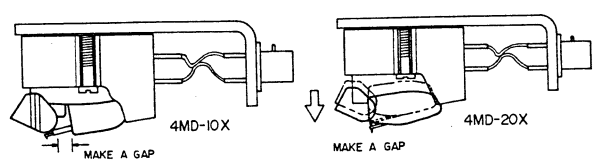


Fig. 22

NOTE: 1. During the adjustment of the VCO, it is better to apply signals to both channels simultaneously, but it is also necessary to identify whether beats are developed between the input signal and the leakage from the VCO of the opposite channel, or between the input signal and the input 30 kHz signal. This identification can be made by examining the variation of the input signal when the input frequency is varied slightly.

2. When the adjustment is made using test records, the gap between the stylus and the cartridge body must be determined empirically. In this case it is necessary that the gap be increased gradually to check whether beats are generated or not, subject to the wow & flutter of the turntable.

3. When VCO is not adjusted, beats will be heard when the stylus is placed on or taken off the record surface. Besides, beats are likely to be heard when the record is worn and the carrier level has diminished.

b) 30 kHz Level Control (Lock Range Control)

The 30 kHz level control adjustment entails setting variable resistor VR11 for user servicing and presetting variable resistor VR205 to absorb unevenness of the circuit from unit to unit. To precisely adjust preset VR205, it is necessary to use an FM modulator. A simple adjusting method using cartridge 4MD-10X or, 4MD-20X and record RG1257 Bands 4,5 is explained; First turn the 30 kHz level (on the rear of the set) fully counter-clockwise. Then turn it by six clicks in clockwise direction. While playing RG1257 Band 5 turn preset variable resistor (VR205) until the sound changes suddenly. At this moment the output wave form becomes as shown in Fig. 23 having one or two projections above the sine wave. At this time make sure of the following two points:

i) Playing Band 5, the projections disappear when the variable resistor is turned counter-clockwise by one graduated scale.

ii) On Band 4, no projections appear when the variable resistor has been turned by 6 clicks.

Fig. 23

NOTE: 1. 30 kHz Level Adjusting Signal

In order to establish a correct lock range for the cartridge being used, a difference signal of 400 Hz with ±4 kHz deviation is recorded on the adjustment record supplied with the Demodulator. To get high fidelity sound from CD-4 records, a lock range of ±10 kHz is sufficient. This frequency deviation of ±10 kHz is, however, not suitable for the signal adjustment because it leads to a high demodulated output.

Therefore, the test signal uses a deviation of ±4 kHz and has a carrier level 4 dB lower than that of the regular record. For example, with a cartridge which picks up a carrier of -50 dBs from an ordinary CD-4 record, if the carrier level is set so as to obtain a lock range of ±4 kHz when a carrier of -54 dBs is applied, the lock range when playing ordinary CD-4 records will be ±10 kHz, as understood from Fig. 24.

2. When the reproduced wave forms have the shape shown in Fig. 25 (a) irrespective of the position of the variable resistor, it shows that the FET is not controlled properly and something is wrong in the VR11, X207, D201, D202, VR205 or X209 circuit.

3. When the reproduced wave form becomes a sine wave (Fig. 25 (b)) irrespective of the volume position, FET X209 may be regarded as being open.

4. Since the rectangular waves at PLL IC pin (4) and pin (5) and the triangle wave at pin (9) are oscillation signals from VCO, they are the unmodulated 30 kHz signals when no input is applied. When these waves are not formed, the IC may be defective. However, the wave forms will be out of shape if the measuring system has a large capacity.

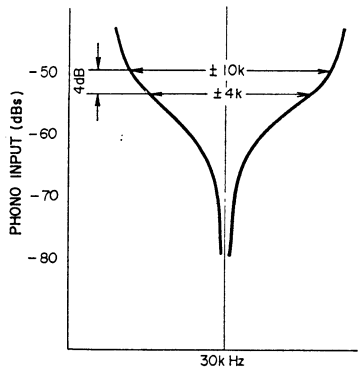


Fig. 24

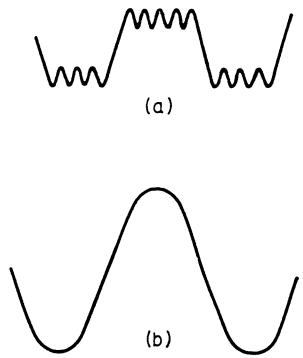


Fig. 25

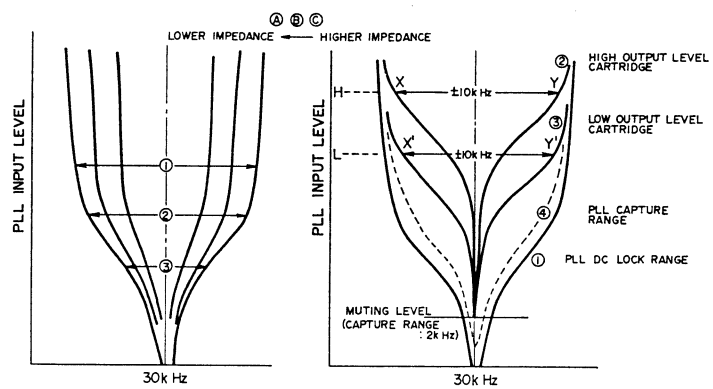
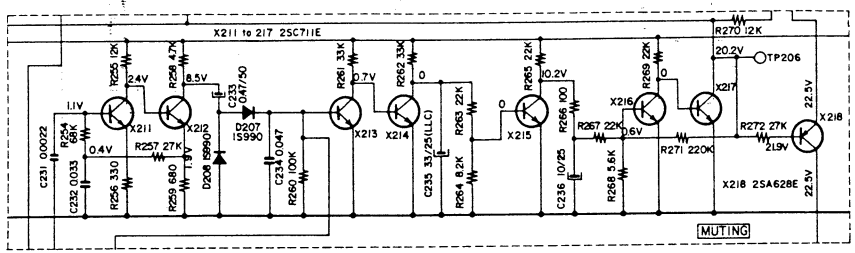


Fig. 26

5. Actual Circuit

The operation of the difference signal demodulation circuit will be explained taking the left channel of the CD-4 demodulator as an example (see attached circuit diagram). The 30 kHz carrier modulated by the difference signal is transmitted to X201 after having been amplified by the 1/2 equalizer. The base circuit of X201 incorporates an active high pass filter with 20 kHz cut-off which removes the sum signal at 12 dB/oct. The sum signal component which was left unremoved here can be removed by the highly selective PLL which was designed so as to be locked only to the carrier component. There are attenuators R211 (=15 kΩ) and R217 (=560Ω) at the PLL input. The gain between PHONO input and PLL was designed to be 25 dB.

X207 is a control signal amplifier stage and has, at its input, a variable resistor (VR11) for 30 kHz level adjustment and a high pass filter. VR11 is used to obtain one of the curves (2) or (3) in Fig. 26 according to the cartridge used. The control signal of the FET forms a negative voltage which is rectified after amplification by X207. The source-drain resistance R_{DS} becomes open at a gata voltage of -1.5 V. Starting at this voltage, the negative voltage becomes smaller as the input signal decreases.



SCHEMATIC 4

Signal application point		Measuring point		Representative measured value			Remarks
(L)	(R)	(L)	(R)	100 Hz	1 kHz	10 kHz	
TP301	TP302	TP303	TP304	-0.5 dBs	-4.5 dBs	-22.0 dBs	

NOTE: The frequency characteristic of the PM/FM equalizer is as shown in Fig. 27

Chart 13

Input signal	Measuring point	Adjusting point	Adjusting method
Record used:			
RG1256	L: CP323	VR303	
Band 8	R: CP324	VR304	The level at the
	L: TP303	VR203	measuring point
Cartridge used:	R: TP304	VR204	is adjusted to
	L: [16]	R547	-15 dBs.
4MD-20X or			
4MD-10X	R: [18]	R548	

Chart 14

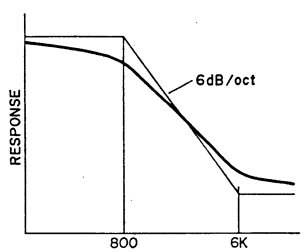


Fig. 27

Signal application point	Input level measuring point	Output level measuring point
L: TP301	TP303	TP117
R: TP302	TP304	TP118

Chart 15

Frequency of the input signal	Input level	Output level
High frequency band (15 kHz)	-15 dBs	-14 dBs±2 dB
	-25 dBs	-29 dBs±1 dB
	-40 dBs	-54 dBs±2 dB
Medium frequency band (600 Hz)	-15 dBs	-14 dBs±2 dB
	-25 dBs	-30 dBs±1 dB
	-35 dBs	-46 dBs±2 dB

Chart 16

6) Checking the Muting Circuit
SCHEMATIC–4 shows the waveform and voltage of the CD-4 muting circuit. The figure in ▭ indicates the voltage when the 30 kHz carrier is applied; and the voltage in ( ) shows the one when no 30 kHz carrier is applied.
The AC wave forms and levels given are the ones when the 30 kHz signal at -50 dBs is applied to PHONO IN.

NOTE: 1. The muting circuit will not operate without the carrier component. When it is required to keep the muting circuit OFF during service checking of the demodulation section, TP206 should be grounded.
2. When the muting circuit is OFF, the input level is -85 dBs±5 dB at the PHONO input terminals.

7) Checking the PM/FM Equalizer
The PM/FM equalizer is comprised of an emitter-follower. Checking is done using an Audio oscillator.
Signal application level: 0 dBs

8) Adjusting the Demodulated Output
The ANRS (Automatic Noise Reduction System) in the CD-4 system is constructed so that a complementary relationship exists between the recording system and the playback system and so that a predetermined signal level must be applied to the expander section to obtain a predetermined modulated signal. This predetermined signal level or ANRS expander input at 0 VU in the recording system is set at -15 dBs. The adjustment is carried out playing test record RG1256 Band 8.

9) Checking and Adjusting the ANRS Expander
Checking and adjusting the ANRS expander is carried out by using an audio oscillator. Make sure that the separation tuning variable resistors are set to minimum. Input application and measuring point are as listed in the following table.

a) Checking and Adjusting the CD-4 Demodulator
Properly adjusted CD-4 demodulator has following levels:

Readjustment if necessary is carried out in the following sequence:

i) VR301 (L ch) and VR302 (R ch) are turned counter-clockwise and clockwise, respectively prior to adjustment.
ii) When the frequency of the input signal is 15 kHz and the input level is set to -25 dBs at the measuring point, VR303 (L ch) and VR304 (R ch) are adjusted so that the output becomes -29 dBs.
iii) When the input levels are set to -15 dBs and -40 dBs without changing the input signal frequency, make sure that the output levels become as listed in the above table.
iv) When the frequency of the input signal is 600 Hz and the input level is set to -25 dBs at the measuring point, VR301 (L ch) and VR302 (R ch) are adjusted so that the output level becomes -30 dBs.
v) When the input levels are set to -15 dBs and -35 dBs without changing the input signal frequency, make sure that the output levels become as listed in the above table.

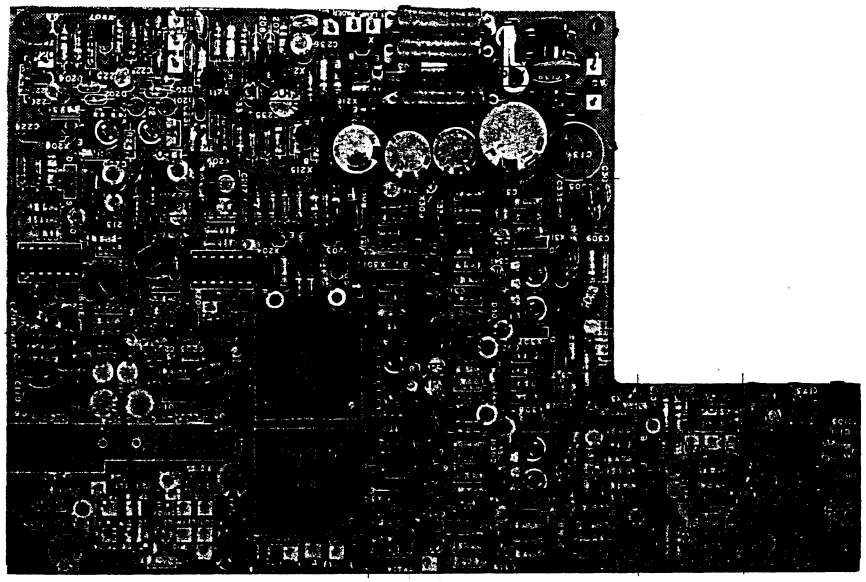


Fig. 28

2. SERVICE POINTS FOR THE CD-4 PLAYBACK SYSTEM

Malfunction in the CD-4 playback system can be caused by a wide variety of factors such as trouble with the record, cartridge, stylus, player and democulator, the connections between these components, and the mishandling of the playback system. Many troubles caused by different factors will present almost the same symptoms. Malfunction can be traced and corrected conveniently by searching for first large, then small problems. Here, some of the major problems which are liable to occur are described.

1) Noise

a) Dust

Due to the improved compatibility of the demodulator, noise is largely decreased. However, CD-4 records are more easily affected by dust than ordinary stereo records. When the stylus tracks at a frequency as high as 30 kHz, a system which can accurately track high frequencies is required.

Therefore even fine dust should be eliminated as far as possible.

Dust adheres not only to the record surface but alsó to the stylus. During tracking along the groóve, the stylus collects dust from the record surface and removes record material which may be deposited on the stylus. The record material deposited in this manner will be melted by the heat generated by the friction between the stylus and record surface. Cleaning fluids and drops of water will soften the record material and cause the dust to coagulate, so that they are both useless and harmful.

b) Requirements of the cartridge

It is not easy to pick up the 30 kHz signals from the record surface with a mechanical vibrating system. The high frequency characteristics of a cartridge is determined almost entirely by the configuration and structure of stylus used, so that a 2 ch stylus is not sufficient even if the cartridge body is suitable for CD-4.

Make sure the cartridge and stylus are both specified for CD-4 use. (With the highly compatible CD-4 demodulator, playback is sometimes possible using a 2 ch cartridge.)

The 2 ch cartridge is designed to cover only the audible range so that this type of cartridge cannot always be used in CD-4 playback. Even if playback is possible according to specifications, many cartridges are magnetized in the wrong polarity and are therefore unsuitable. The polarity of magnetization is no problem in playing back stereo records, but it must be correct for playing back CD-4 records. If the polarity of magnetization is wrong, the front and rear channels will be reversed in playback.

c) Requirements in the player

It is important that the 30 kHz signal picked up by the cartridge be sent to the demodulator with as small a loss as possible. The signal cord from the player plays an important role in this. The optimum load of a CD-4 cartridge is 100 kΩ, 100 PF and the input capacity of the demodulator is in the order of about 50 PF, so that the optimum condition is that the signal cord should have a capacity less than 50 PF. A capacity of 50 PF is provided by 1.2m of 40 PF/m low capacitance cable.

Care must be taken in such cases as when a player switching box is used in a store.

d) Noise from the demodulator

Noise is transmitted together with the sum and difference signals. The noise relating to the sum signal and the noise relating to the difference signal are distinguished from each other roughly as follows:

Noise associated with sum signal:

Noise which is generated at the 2 CH position.
Noise which disappears when the spearation variable resistor is set to minimum.

Noise associated with difference signal:

Noise which is generated even after the separation variable resistance has been set to minimum.

The noise associated with the signal includes comparatively well known transistor noise and other external noises. The noise associated with the difference signal can be distinguished between those appearing before demodulation and those appearing after demodulation depending on whether they are heard only when the muting is turned ON or when it is turned ON and OFF. When no record is played back, noise is heard, it may be because of noise from the muting circuit.

e) Noise generated in playing back stereo records

As CD-4 incorporates an auto-muting circuit, little noise will be generated even when a stereo record is played back in the 4CH-AUTO and CD-4 positions. However, there are some exceptions. They are stereo records with an unnecessary super-sonic component engraved (non-distortion cutting) on the surface, which have a high frequency oscillator in the cutting process. With such records, set the demodulator switching knob to "2 ch" before playback.

2) Separation

Separation is so sensitive that the effectiveness of a CD-4 playback system is mainly determined by its separation. If the sum signal and difference signal differ from each other by 1 dB immediately before they enter the operation circuit in the demoduator, channel separation will be less than 20 dB.

If the difference in pahse is 10°, separation will be degradated additionally by 5-6 dB. Level may be controlled in the medium frequency range by adjusting the separation, but the disturbance in high frequency characteristics due to the cartridge used cannot be compensated for. Phase is influenced by the frequency characteristics in the audible frequency range of the cartridge used and also by the difference signal transmission system. It is not uncommon that the shift of phase results from mechanical factors such as inclination of the cartridge, stylus pressure, etc. The largest cause of separation degradation in the demodulator is frequency characteristics at various points. Separation degradation is prevented only by checking and adjusting the various of the demodulator carefully.

When no separation can be achieved at all, this shows that eigher the sum signal or difference signal is not present, so that this must be distinguished clearly from the case of poor separation. It is necessary that the separation of a demodulator should be checked when the characteristics of the various parts are correct. If it is found that the characteristics of the various portions are correct, the cause of the poor separation must lie elsewhere.

3) Beats

The CD-4 high compatibility demodulator incorporates a 30 kHz oscillator. During normal operation, the oscillation is synchronized with the 30 kHz input signal. However, when the input level is low and there is a frequency difference between the sum and difference signals, beats will be generated. For example, if the speed of the player differs by 10%, the oscillation frequency of normal 30 kHz will become either 27 kHz or 33 kHz and beats will be generated. When the oscillation frequency of PLL is shifted, the same result will be obtained.

X. CD-4 P.C. BOARD OPERATION

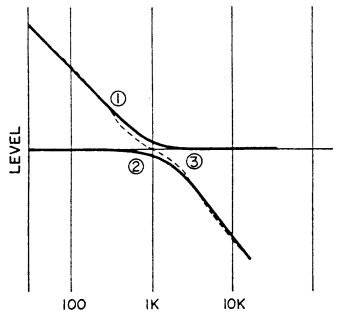


Fig. 29

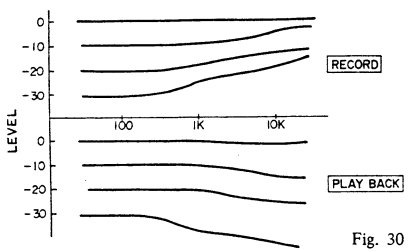


Fig. 30

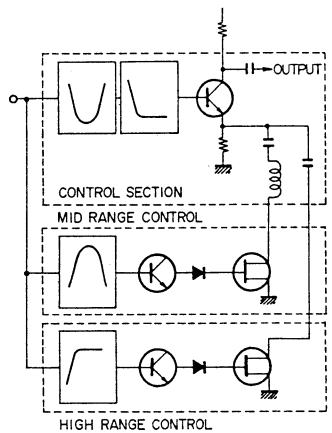


Fig. 31

To understand CD-4 demodulator operation, please refer to the block diagram. The parts numbers used in the following explanation, except for the mute circuit, are left channel only.

The pick-up cartridge output signal which is introduced to the PHONO input terminal enters IC101 of the 1/2 Equalizer (turn-over) section. The frequency response of this 1/2 Equalizer is as shown by curve (1) (1 kHz gain 34 dB) of the graph in Fig. 29.

The signal amplified at this Equalizer is the less than 15 kHz sum signal (FL+RL) and the 20 to 45 kHz difference signal (FL-RL).

The sum signal passes low pass filter (F101) and is supplied to IC103 of the next stage 2/2 Equalizer (roll-off) section. The frequency response of this 2/2 Equalizer is as shown by curve (2) of the graph shown in Fig. 29.

Accordingly, the frequency response of the sum signal from the 2/2 Equalizer becomes as shown by curve (3) of the graph in Fig. 29 (passes RIAA curve) and flat sum signal frequency response is obtained.

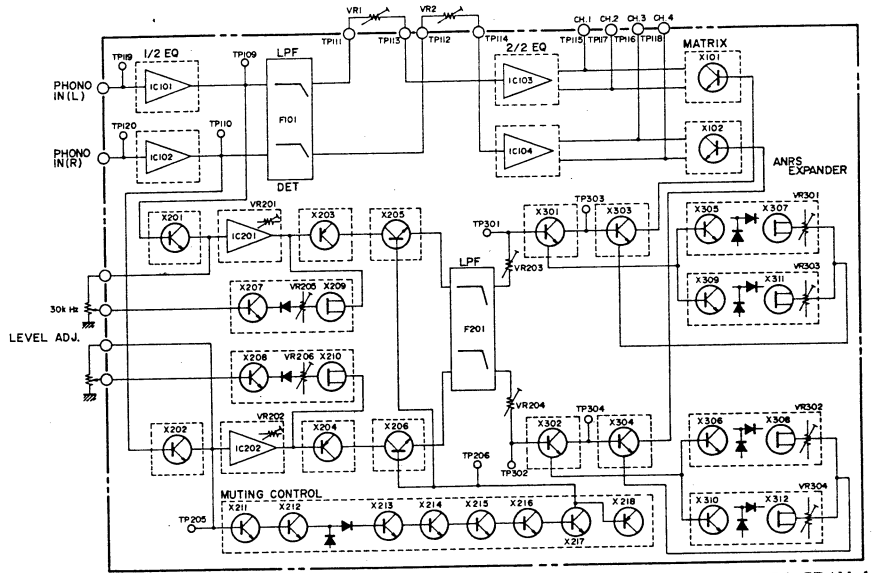
The difference signal passes the high pass filter which is comprised of X201 and is supplied to the demodulator which is comprised of the next stage PLL IC (IC201). X201 output is supplied to lock range control and controls the discriminator width of PLL IC, the right channel X202 output signal is supplied to the mute circuit, and the difference signal demodulated output is taken from pin (7) of PLL IC.

The demodulated signal (which was demodulated at PLL IC) is amplified at X203, passes muting gate X205 and at low pass filter F201, except for the 30 kHz car ier element, becomes the audio signal of the difference signal system.

The carrier element taken from X202 is supplied to the mute circuit. Consequently, when there is no carrier (no difference signal) the muting gate (X205) is turned ON, and there is no output signal emitted from X205 output side.

In cutting a CD-4 record because PM-FM is supplemented for frequency compensation, it is necessary to revert to this condition at playback time. The PM-FM equalizer is comprised of the CR network in the X301 circuit and the PM-FM equalizer output is supplied to the next stage ANRS. The ANRS is for the purpose of reducing noise generated by mechanical change of the CD-4 record. (cutter → record → pick up cartridge)

Such noise is played back at a certain level as background noise. Consequently, if the music source is at a low level, an unpleasant noise is heard. To reduce this disadvantageous noise, the cutting volume level of mid-range and high range frequencies are boosted at cutting time, and then at playback time, these previously boosted mid range and high range levels are reduced. (Refer to Fig. 30)



CD–4 BLOCK DIAGRAM 1

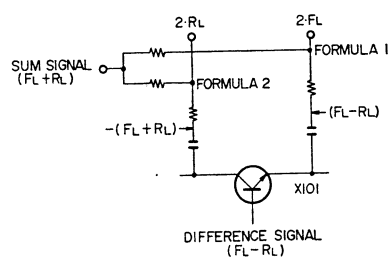


Fig. 32

As shown in Fig. 31, the playback system ANRS expander circuit is comprised of 3 different sections.

The base side of the control section is equipped with mid range and high range cut filters which change resistance R_{DS} between the drain and source of the mid range frequency control section and the resistance R_{DS} between the drain and source of the high range frequency control section.

Consequently, at mid range and high range frequencies, the signals pass the network and the amplitude of control section X303 is changed. Because X303 amplitude is changed by the input signal level, the ANRS supplement is also according to the input signal level.

The difference signal from the record which is detected by the pick up cartridge passes this ANRS expander and the difference signal frequency response becomes flat.

This difference signal output together with the sum signal is supplied to the matrix circuit. (Refer to Fig. 32)

Difference signal (FL-RL) is supplied to the base of X101, the collector output is phase inverted-(FL-RL) and an in-phase (FL-RL) signal is emitted at the emitter output.

Therefore the formula for difference signal and sum signal is as follows:

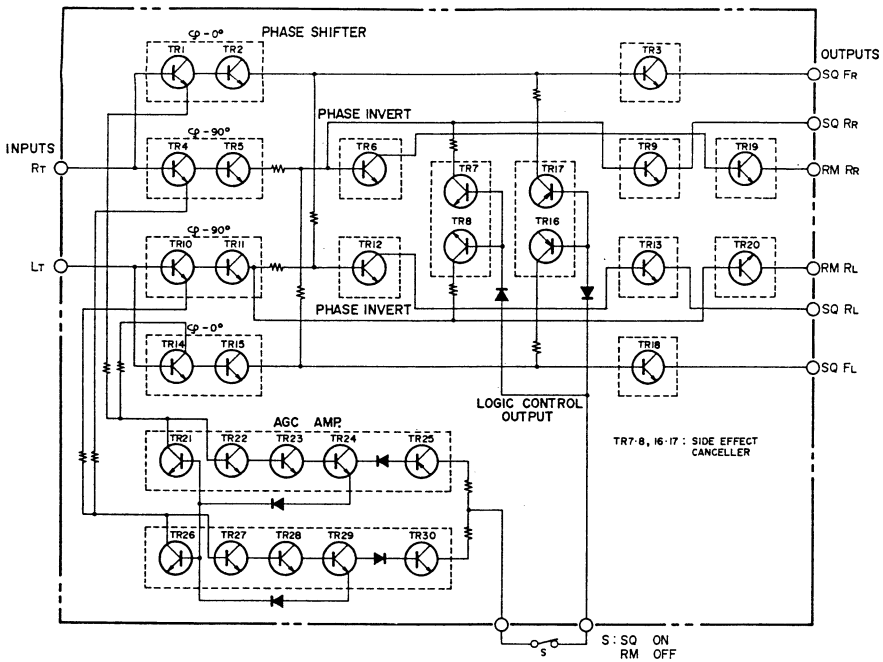
$$(FL+RL)+(FL-RL) = 2\cdot FL \ldots (1)$$
$$(FL+RL)-(FL-RL) = 2\cdot RL \ldots (2)$$

2·FL and 2·RL are produced by the above formulas (1) and (2).

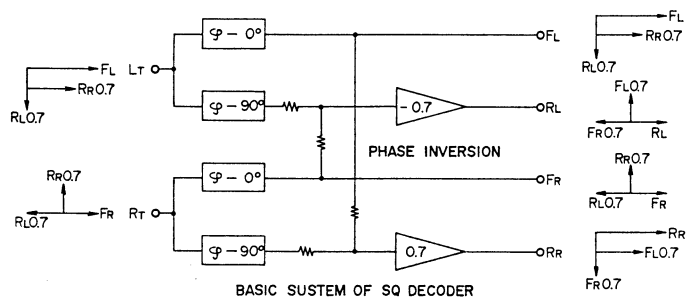
For optimum separation, it is necessary for the difference signal and sum signal levels to display conformity. However the sum signal system output level differs depending upon pick up cartridge type, etc.

Therefore, in order to obtain sum signal and difference signal level conformity, a volume control is installed between the 1/2 equalizer and 2/2 equalizer to adjust the level of sum signal to that of the difference signal.

XI. SQ & RM OPERATIONG PRINCIPALS

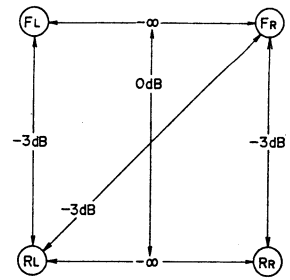


SQ & RM BLOCK DIAGRAM 2



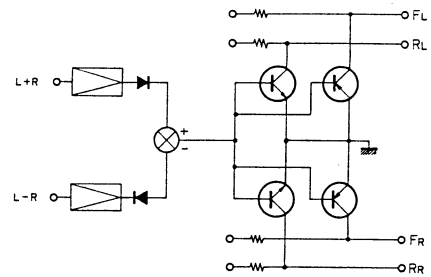
BASIC SUSTEM OF SQ DECODER

Fig. 33



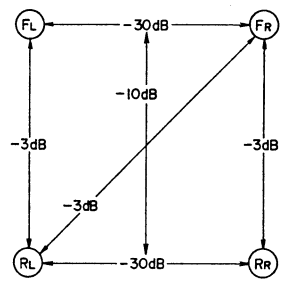
SQ MATRIX SEPARATION OF EACH CHANNEL
(WITHOUT LOGIC CIRCUIT)

Fig. 34



FRONT/BACK LOGIC BLOCK DIAGRAM

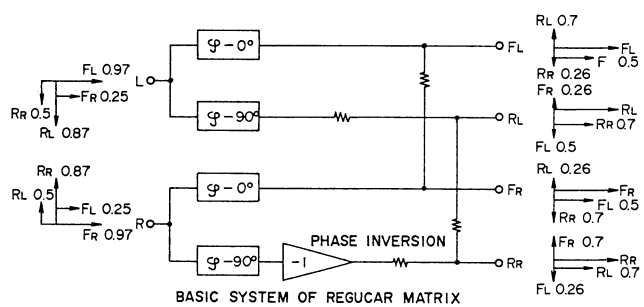
Fig. 35



IMPROVED SEPARATION BY MEANS
OF FRONT/BACK LOGIC

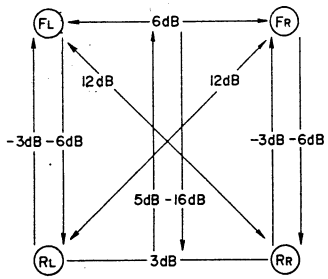
Fig. 36 FRONT–BACK LOGIC

|L+R| > |L-R| ... Rear Damping
|L+R| < |L-R| ... Front Damping
|L+R| ≅ |L-R| ... Not Operating



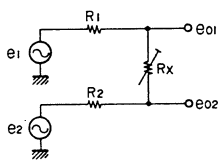
BASIC SYSTEM OF REGUCAR MATRIX

Fig. 37



REGULAR MATRIX SEPERATION

Fig. 38



SQ LOGIC EQUIVALENT CIRCUIT

Fig. 39

Front Back Logic Operating Principals

Front left/right separation can be attained to infinite (∞), but when the sound image is centered on front or rear, front/rear separation cannot be attained. Consequently, crosstalk including a phase inverted element is forcibly applied to L_T, R_T output, and this phase inverted element is cancelled.

If we figure degree of attenuation (k_1, k_2) based on Fig. 39.

$$k_1 = \frac{e_{o_1}}{e_1} = \frac{R_2+R_X}{R_1+R_2+R_X} + \frac{R_1}{R_1+R_2+R_X} \cdot \frac{e_2}{e_1}$$

$$k_2 = \frac{e_{o_2}}{e_2} = \frac{R_1+R_X}{R_1+R_2+R_X} + \frac{R_2}{R_1+R_2+R_X} \cdot \frac{e_1}{e_2}$$

However, R_X is the variable resistor.

Assuming that the logic circuit is ON, $e_1=-e_2$ is provided, and the variable resistor value is R_{XO}, the above formula becomes:

$$k_1 = \frac{R_2+R_{XO}-R_1}{R_1+R_2+R_{XO}} \qquad k_2 = \frac{R_1+R_{XO}-R_2}{R_1+R_2+R_{XO}}$$

By providing each resistance vlaue, the desired logic attenuation volume (for instance 10 dB attenuation) can be obtained. Whether the logic circuit operation is provided to the F_L,F_R front channels or R_L,R_R rear channels is determined by which of the components (in-phase component or inverted phase component) included in L_T, R_T is the larger.
In other words, if the in-phase component is the larger, the rear channels are attenuated (damped) by the logic circuit and if the inverted phase component is the larger, the front channels are attenuated.
Therefore, operation is as per the following three formulas:

in case of $|L_T+R_T| > |L_T-R_T|$ damping is applied to rear direction channels.

In case of $|L_T+R_T| < |L_T-R_T|$ damping is applied to front direction channels.

In case of $|L_T+R_T| = |L_T-R_T|$ no operaton exists.

XII. POWER AMPLIFIER ADJUSTMENTS

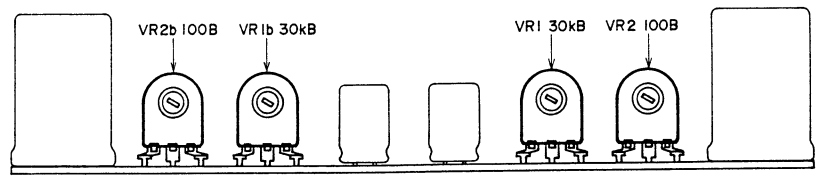


Fig. 40

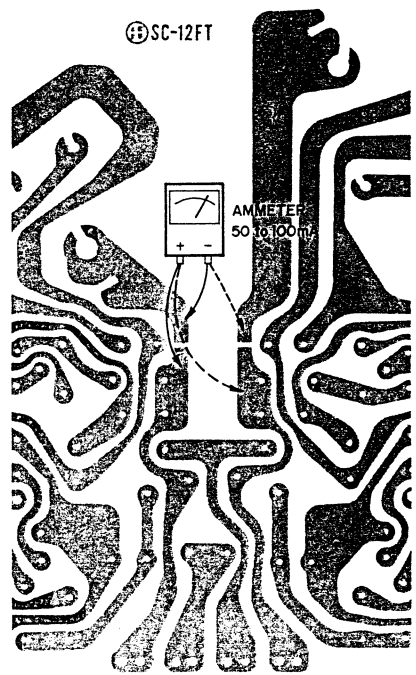


Fig. 41

1. POWER AMP. NON-INPUT CURRENT ADJUSTMENT (Refer to Figs. 41,42)

1) As shown in Fig. 43, remove solder from soldering point of Power Amp. P.C. Board.
2) Connect a 50 to 100 mA scale ampere meter to the place from which the solder was removed in Item 1-1). (Fig. 41)
3) Adjust semi-fixed resistors VR2 100B(Left) and VR2b 100B(Right) of Power Amp. P.C. Board shown in Fig. 40 to obtain a 40 mA ampere meter indication on both the left and right channels.

2. VOLTAGE ADJUSTMENT BETWEEN POWER TRANSISTORS C–E

1) Connect voltage meter to collector of Power Amp. P.C. Board Power Transistors TR6, TR6b shown in Fig. 42.
2) Adjust semi-fixed resistors VR1 30 kB(Left) and VR1b 30 kB(Right) of Power Amp. P.C. Board shown in Fig. 40 to obtain half the value of the power source voltage.

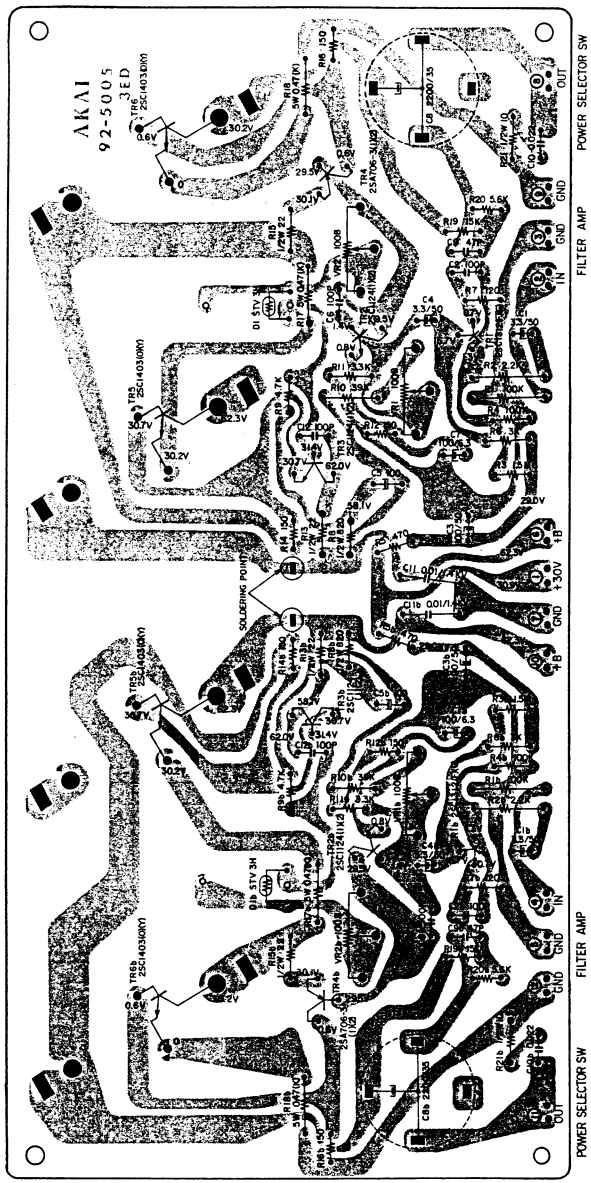


Fig. 43 POWER AMP. P.C. BOARD 92-5005 (Reverse)

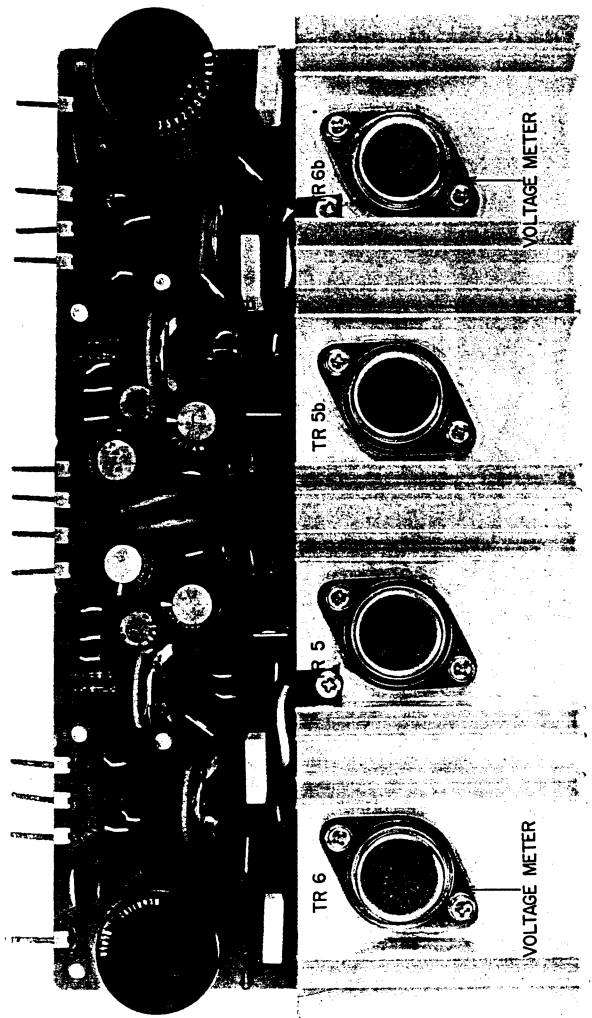
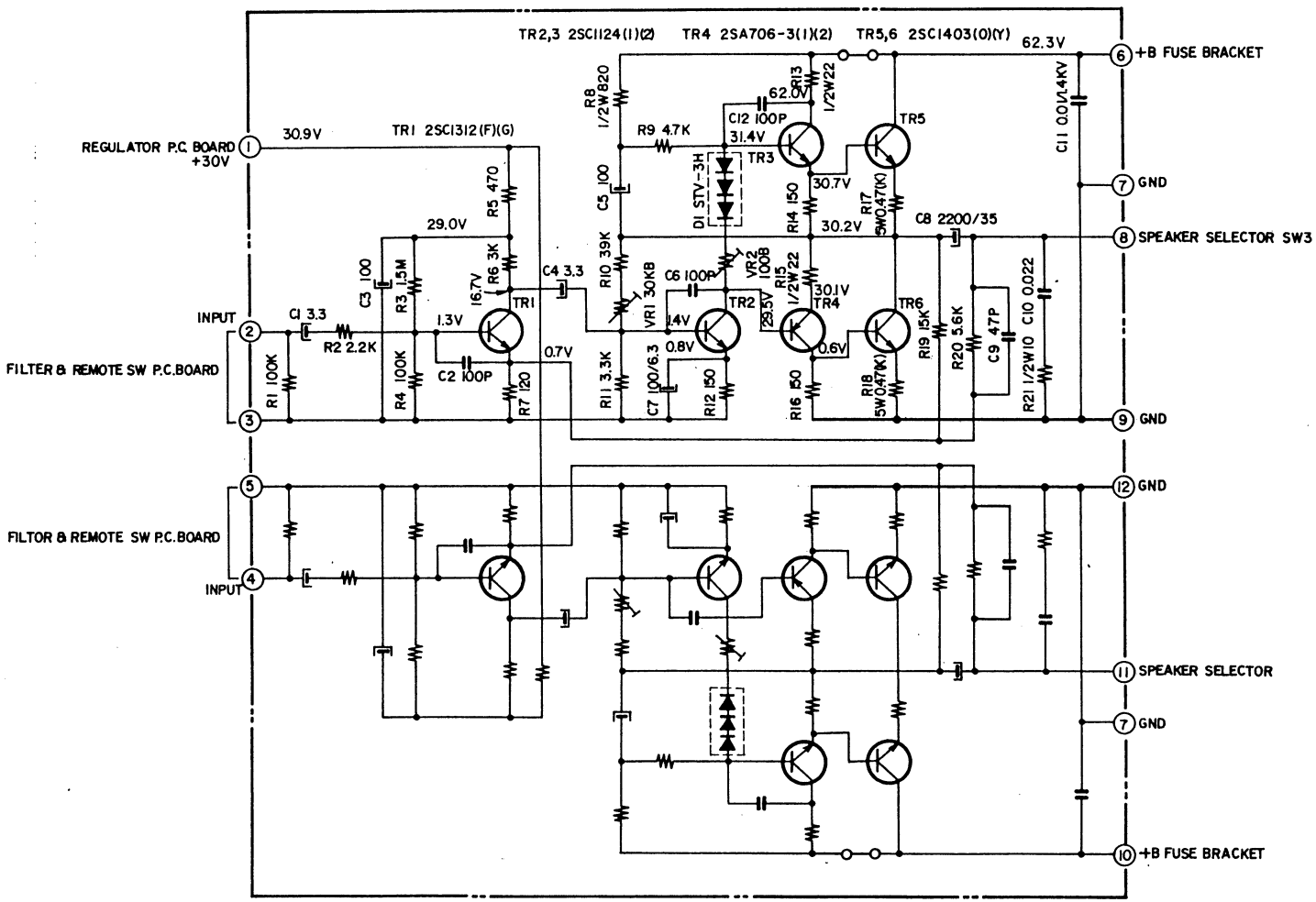


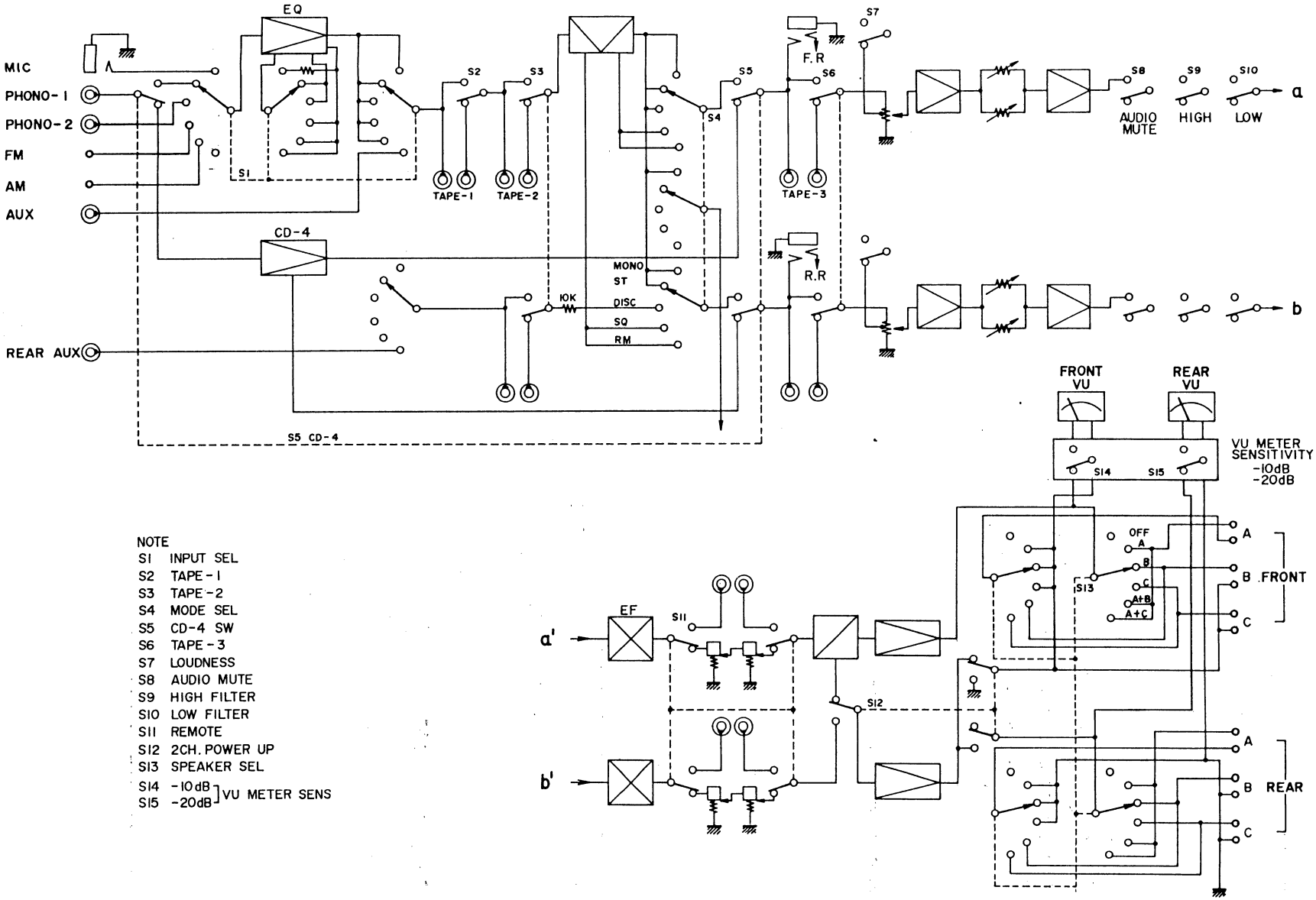
Fig. 42 POWER AMP. P.C. BOARD 92-5005



POWER AMP. P.C. BOARD 92-5005

NOTE
UNLESS OTHERWISE SPECIFIED
ALL RESISTORS IN Ω 1/4W(J)
ALL CAPACITORS IN μF 50W.V.(J)

SCHEMATIC 5



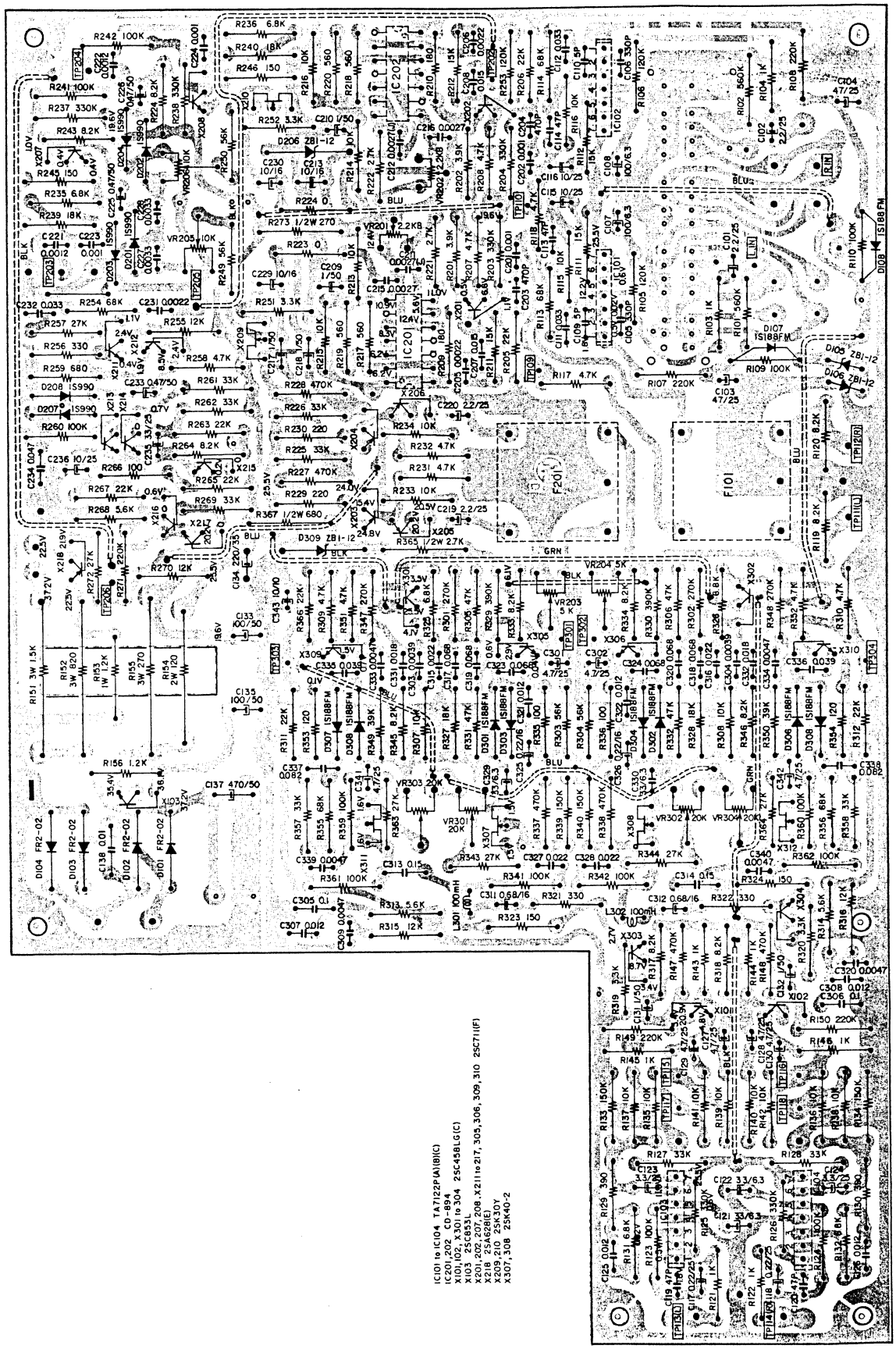
NOTE

S1	INPUT SEL
S2	TAPE-1
S3	TAPE-2
S4	MODE SEL
S5	CD-4 SW
S6	TAPE-3
S7	LOUDNESS
S8	AUDIO MUTE
S9	HIGH FILTER
S10	LOW FILTER
S11	REMOTE
S12	2CH. POWER UP
S13	SPEAKER SEL
S14	-10dB] VU METER SENS
S15	-20dB] VU METER SENS

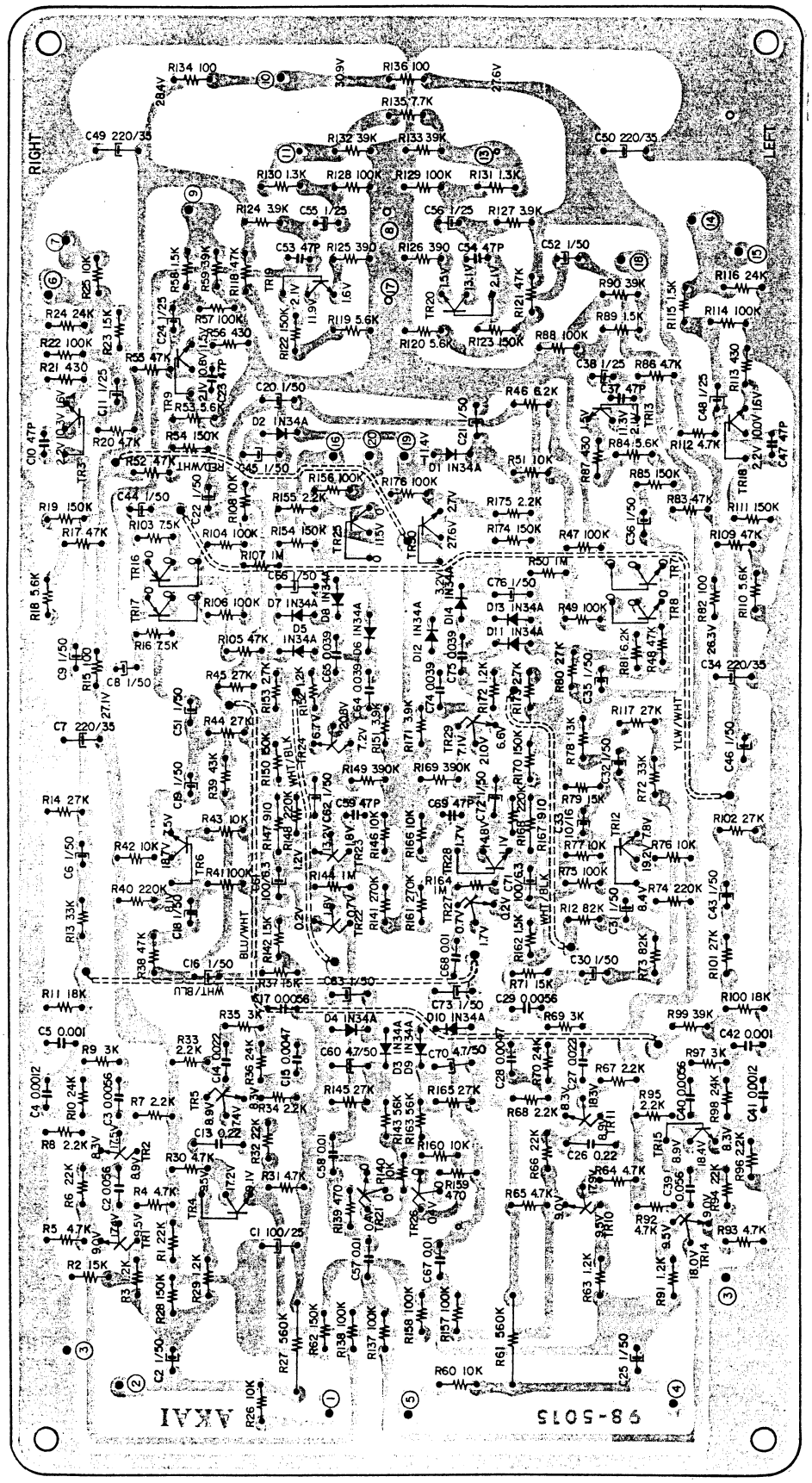
AS-980 AMP. SECTION BLOCK DIAGRAM (Left Channel Only)

XIII. COMPOSITE VIEWS OF COMPONENTS

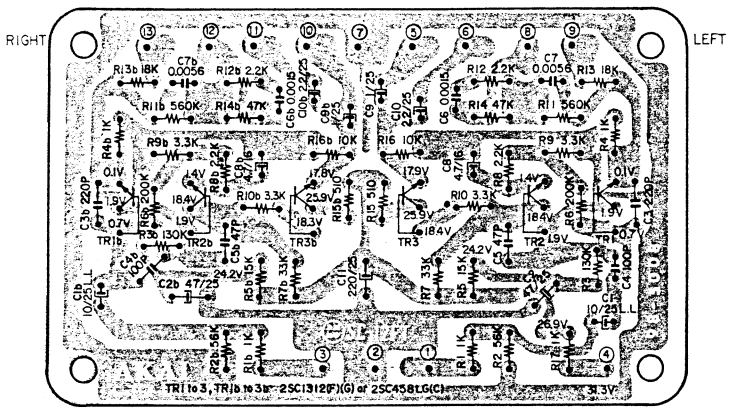
1. CD-4 P.C. BOARD TDM-7



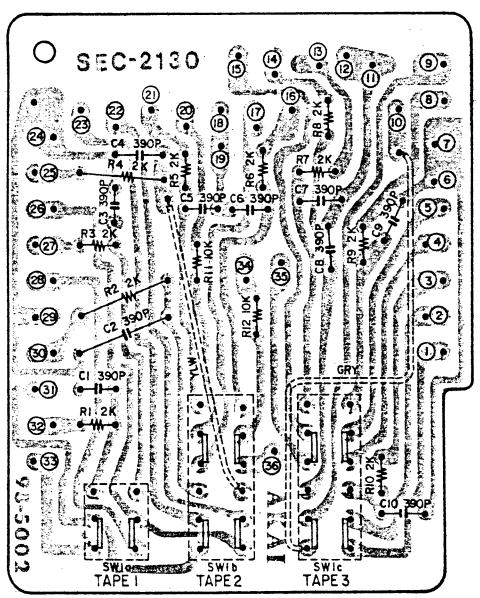
2. SQ P.C. BOARD 98-5015



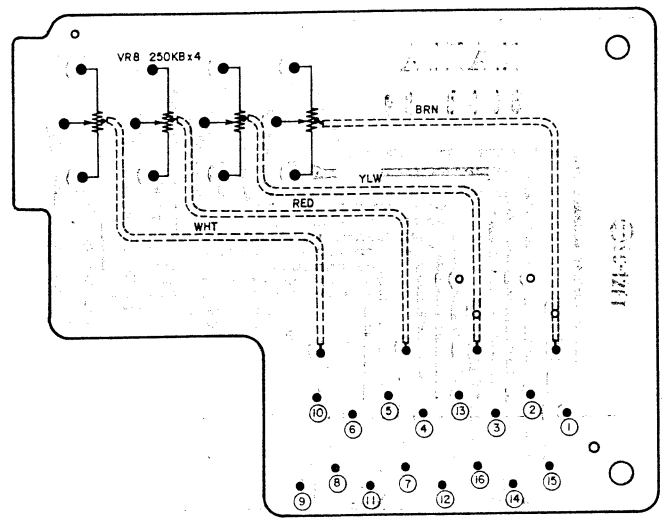
3. EQ AMP. P.C. BOARD 98-5008



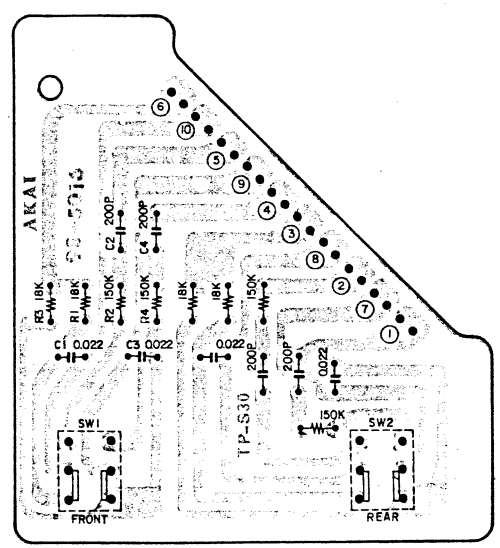
4. TAPE SW. P.C. BOARD 98-5002



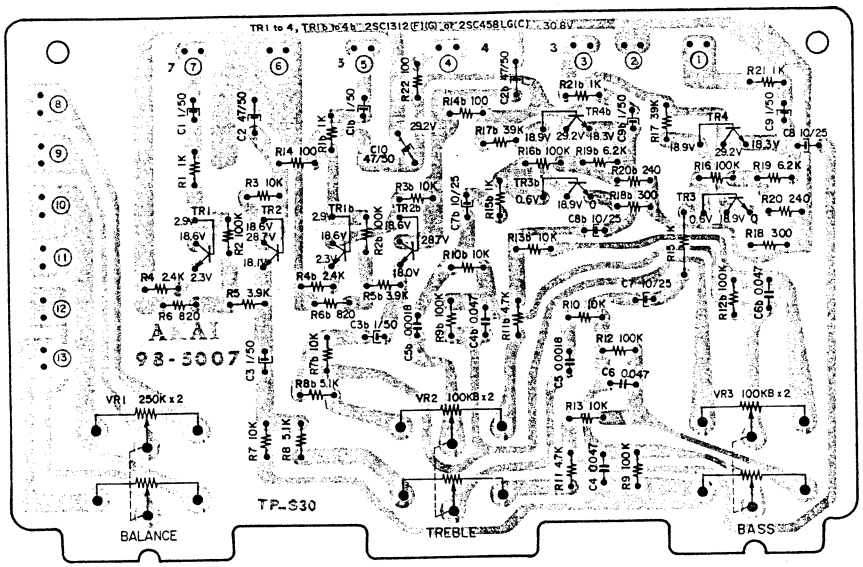
5. VOLUME CONTROL P.C. BOARD 98-5006



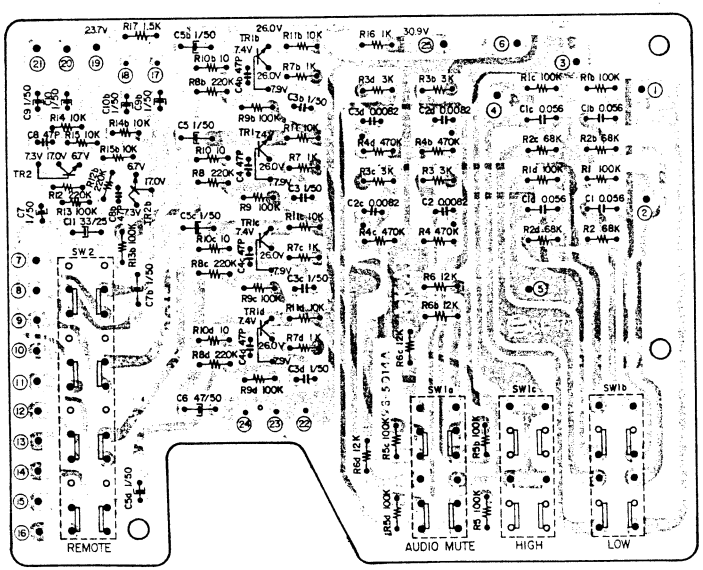
6. LOUDNESS SW. P.C. BOARD 98-5016



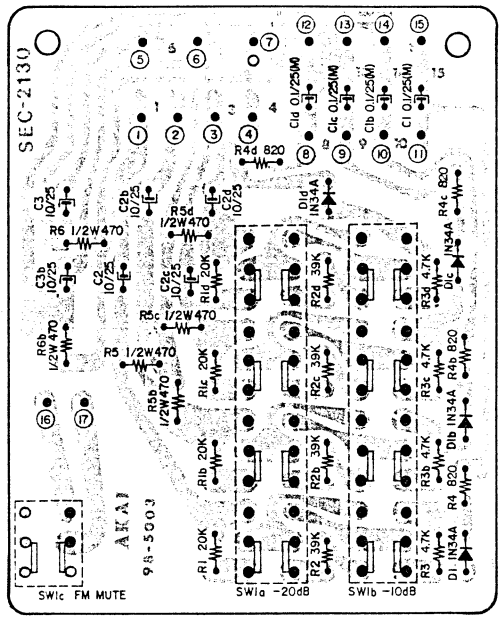
7. TONE CONTROL P.C. BOARD 98-5007



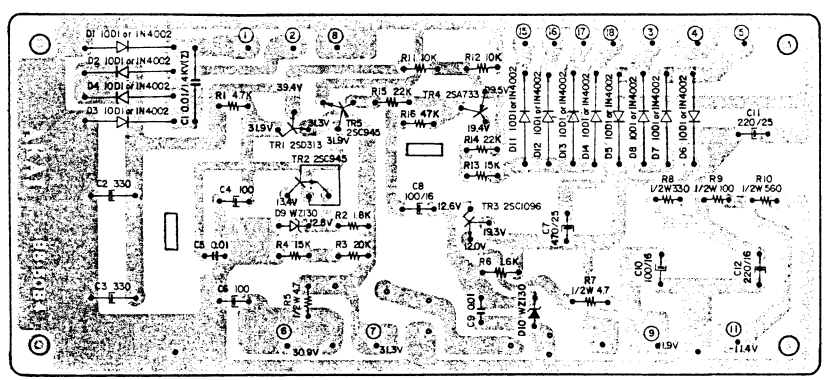
8. FILTER & REMOTE SW. P.C. BOARD 98-5014



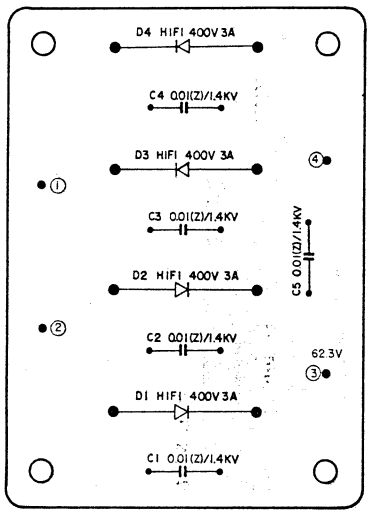
9. METER SW. P.C. BOARD 98-5003



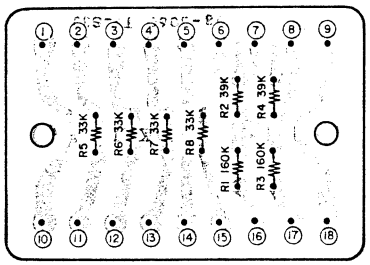
10. REGULATOR P.C. BOARD 98-5084



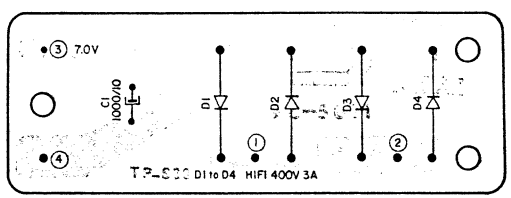
11. RECTIFIER P.C. BOARD (1) 98-5010



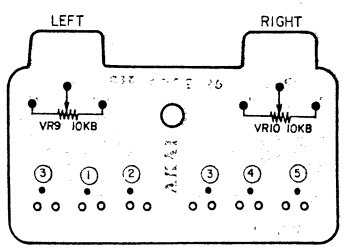
12. RESISTOR P.C. BOARD 98-5060



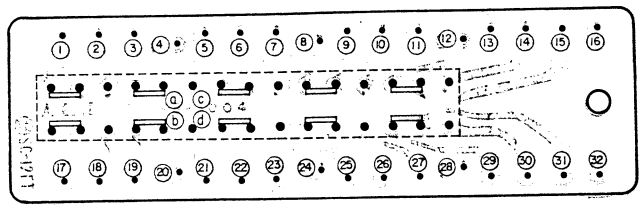
13. RECTIFIER P.C. BOARD (2) 98-5011



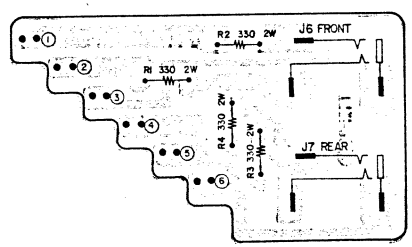
14. CD-4 SEPARATION P.C. BOARD 98-5005



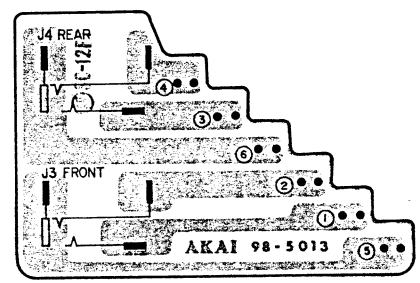
15. CD-4 SW. P.C. BOARD 98-5004



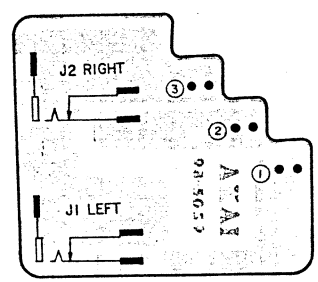
16. HEAD PHONE P.C. BOARD 98-5012



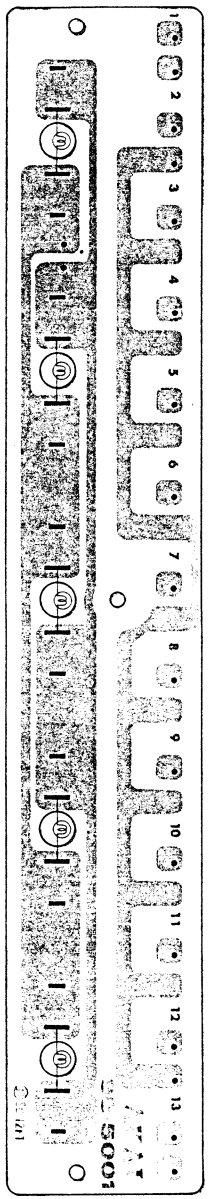
17. DUB P.C. BOARD 98-5013



18. MIC P.C. BOARD 98-5059



19. DIAL ILLUMINATION P.C. BOARD 98-5001



SECTION 2

PARTS LIST

TABLE OF CONTENTS

HOW TO USE THIS PARTS LIST

1. This parts list is compiled by various individual blocks based on assembly process.
2. When ordering parts, please describe parts number, serial number, and model number in detail.
3. How to read list.

- The reference number corresponds with illustration or photo number of that particular parts list.
- This number corresponds with the Figure Number.
- This number corresponds with the individual parts index number in that figure.
- A small "x" indicates the inability to show that particular part in the Photo or Illustration.

12-115x

- Schematic Diagram Number of individual manufactured part. (not required for parts order)
- Quantity of particular part required.

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
		FLYWHEEL BLOCK #13		
12-115x	800425	Flywheel Block Assy. Comp.	RDG#13	1
12-116	244506	Flywheel Only	RD-233	1
12-117x	244754	Felt, Flywheel	RD-275	1
12-118	251324	Main Metal Case	RD-236	1
12-119	253080	Main Metal	RD-237	1

4. The symbol numbers shown on the P.C. Board list can be matched with the Composite Views of components of the Schematic Diagram or Service Manual.
5. The indications of Resistors and Capacitors in the photos of P.C. Board are being eliminated.
6. The shape of the parts and parts name, etc. can be confirmed by comparing them with the parts shown on the Electrical Parts Table of P.C. Board.
7. Both the kind of part and installation position can be determined by the Parts Number. To determine where a parts number is listed, utilize Parts Index at end of Parts List.
   It is necessary first of all to find the Parts Number. This can be accomplished by using the Reference Number listed at right of parts number in the Parts Index. (meaning of ref. no. outlined in Item 3 above).
8. Utilize separate "Price List for Parts" to determine unit price. The most simple method of finding parts Price is to utilize the reference number.

NOTE: In the parts list US-A is the chief standard. Parts used in other than US-A standard areas are itemized by region. Parts not itemized by region can be used in all areas.

Standard		Packing Carton Sticker	AC Cord	Region
US	US-A	AAL 120V	AC Cord CUL	AAL
		EP 110V	AC Cord CUL	PX
	US-B	PRESET 220V	AC Cord CUL	Holland
		PRESET 110V	AC Cord CUL	110V Area
		PRESET 240V 3 CORE	3 Core without Plug	3 Core Area
		WG 220V	HEW-P79	WG
	CSA	CSA 120V	AC Cord CUL	CSA
	CEE	CEE 220V	HEW-P65	CEE
J		J 100V	AC Cord Domestic	Domestic
A		SA 240V 3 CORE	3 Core without Plug	South Africa

ELECTRICAL PARTS TABLE

Because the indication of resistors and capacitors in the P. C. Board photos are being eliminated, please confirm parts name and shape by comparing them with the parts shown in this table.

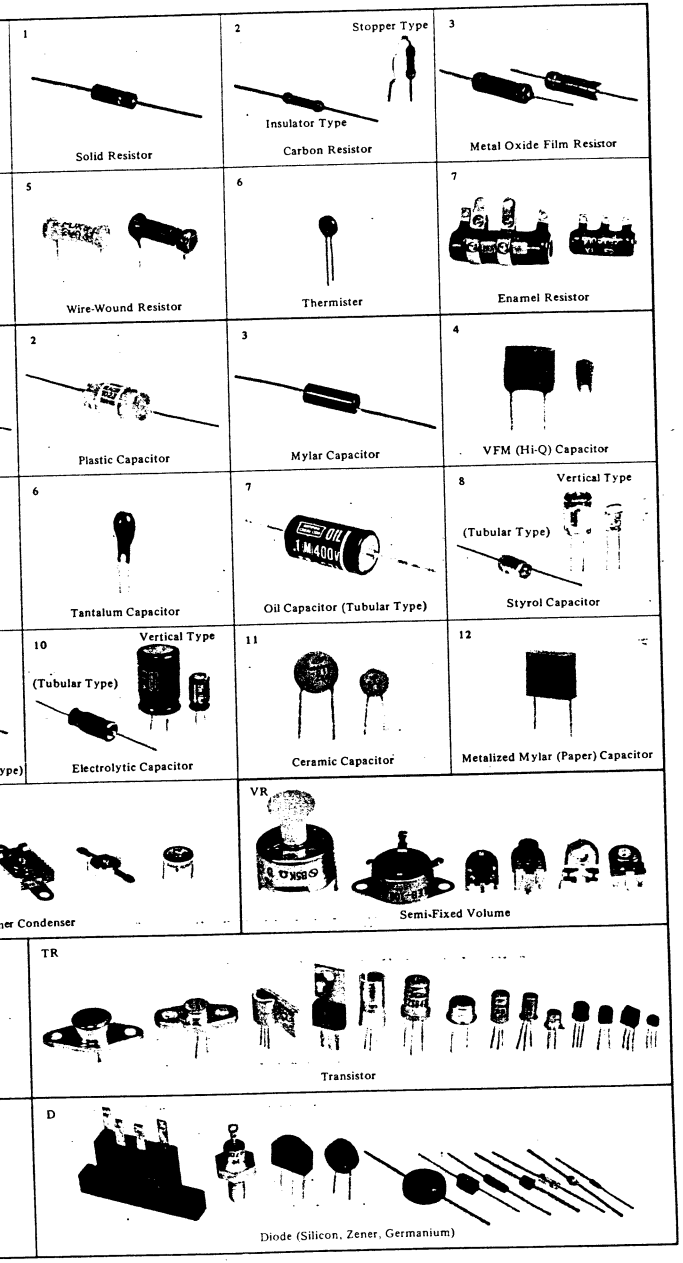
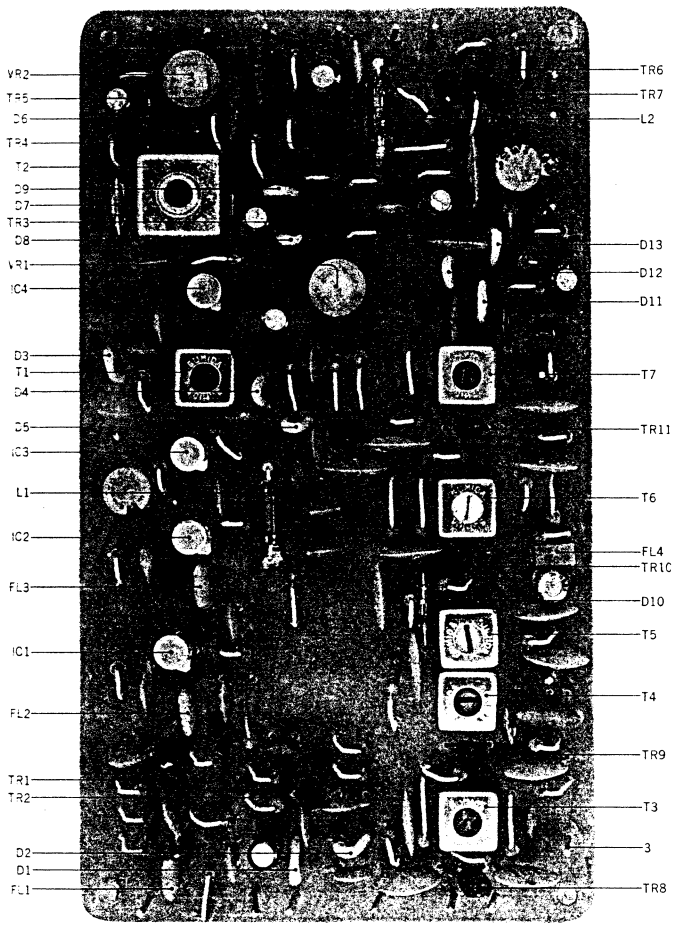


FIG. 1 PHOTO OF IF P.C. BOARD (94-5009)



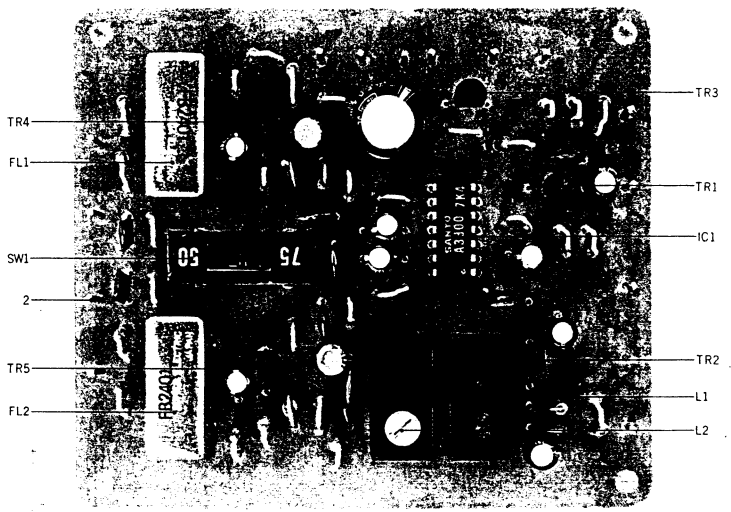
IF P.C. BOARD (94-5009) BLOCK

Symbol No.	Parts No.	Description	Q'ty
1-1x	BA560621	IF P.C. Board Comp. (94-5009)	1
1-2x	BA563850	IF P.C. Board Comp. (94-5009) (US-B)	1
1-IC1 to 4	EI469967	I.C. LA-1221	4
1-TR1, 2	ET520334	Transistor 2SC922(L)	2
1-TR3 to 7	ET380834	Transistor 2SC711(E)	5
1-TR8 to 11	ET427860	Transistor 2SC839(H)	4
1-D1 to 5	ED428264	Germanium Diode 1N60	5
1-D6, 7	ED379855	Germanium Diode 1N60P	2
1-D8	ED514721	Silicon Diode WG-599	1
1-D9 to 13	ED219464	Germanium Diode IN34A	5
1-T1	ET551406	Trans. 05M-033-1329	1
1-T2	EO551395	FM Discri Coil 05M-033-1352B	1
1-T3	EO551417	AM-RF Coil 05M-033-1326	1
1-T4	EO551428	AM-OSC Coil 05M-033-1327	1
1-T5	BT379991	Trans. HI-137S (Yellow)	1
1-T6	BT380384	Trans. HI-134S (White)	1
1-T7	BT443610	Trans. HI-144S (Black)	1
1-FL1 to 3	ER539818	Filter SFE-10.7MA5	3
1-FL4	ER380406	Filter BFB 455B-5	1
1-FL4	ER380417	Filter BFB 464-A	1
1-L1, 2	EO539820	Peaking Coil 2.2μH(K)	2
1-VR1	EV380215	Semi-fixed Volume SR19R 100 kB (Solid type)	1
1-VR2	EV551452	Semi-fixed Volume SR19R 22 kB (Solid type)	1
1-3	EJ539662	Wrapping Post 1x17	20
		Capacitor, Vertical Type	
1-C1, 2, 3	EC551441	Ceramic DD600YM 0.01μF (Z) 50WV	3
1-C4	EC368256	Elect. 0.47μF 25WV	1
1-C5, 6, 7	EC551441	Ceramic DD600YM 0.01μF(Z) 50WV	3
1-C8	EC443654	VFM 15PF(K) 50WV	1
1-C9 to 17	EC551441	Ceramic DD600YM 0.01μF(Z) 50WV	9
1-C18	EC336104	Elect. 100μF 6.3WV	1
1-C19, 20	EC551441	Ceramic DD600YM 0.01μF(Z) 50WV	2
1-C21, 22	EC336216	VFM 330PF(J) 50WV	2
1-C23	EC450527	Elect. 4.7μF 25WV	1
1-C24	EC336216	VFM 330PF(J) 50WV	1
1-C25	EC329771	Elect. 47μF 6.3WV	1
1-C26	EC313108	Elect. 1μF 50WV	1
1-C27	EC290531	VFM 100PF(K) 50WV	1
1-C28, 29	EC551441	Ceramic DD600YM 0.01μF(Z) 50WV	2
1-C30	EC313108	Elect. 1μF 50WV	1
1-C31, 32	EC551441	Ceramic DD600YM 0.01μF(Z) 50WV	2
1-C33	EC450527	Elect. 4.7μF 25WV	1
1-C34, 35	EC492142	Ceramic DD512YM 0.047μF(Z) 50WV	2
1-C36	EC427948	VFM 10PF(J) 50WV	1
1-C37, 38	EC492142	Ceramic DD512YM 0.047μF(Z) 50WV	2
1-C39	EC250841	Mylar 0.01μF(J) 50WV	1
1-C40	EC443632	VFM 430PF(J) 50WV	1
1-C41	EC492142	Ceramic DD512YM 0.047μF(Z) 50WV	1
1-C42	EC558494	VFM 13PF(J) 50WV	1
1-C43 to 45	EC942142	Ceramic DD512YM 0.047μF(Z) 50WV	3
1-C46	EC450527	Elect. 4.7μF 25WV	1
1-C47 to 51	EC492142	Ceramic DD512YM 0.047μF(Z) 50WV	5
1-C52	EC329850	VFM 220PF(J) 50WV	1
1-C53, 54	EC492142	Ceramic DD512YM 0.047μF(Z) 50WV	2
1-C55	EC336104	Elect. 100μF 6.3WV	1
1-C56, 57	EC250841	Mylar 0.01μF(J) 50WV	2
1-C58	EC450527	Elect. 4.7μF 25WV	1

Symbol No.	Parts No.	Description	Q'ty
		Resistor, Stopper Type	
1-R1	ER211667	Carbon RD1/4 100(J)	1
1-R2	ER212681	Carbon RD1/4 330(J)	1
1-R3	ER306887	Carbon RD1/4 15k(J)	1
1-R4	ER212872	Carbon RD1/4 4.3k(J)	1
1-R5	ER212681	Carbon RD1/4 330(J)	1
1-R6	ER211465	Carbon RD1/4 1k(J)	1
1-R7	ER212883	Carbon RD1/4 4.7k(J)	1
1-R8	ER306843	Carbon RD1/4 1.2k(J)	1
1-R9	ER357491	Carbon RD1/4 82k(J)	1
1-R10	ER306887	Carbon RD1/4 15k(J)	1
1-R11, 12	ER212681	Carbon RD1/4 330(J)	2
1-R13	ER304290	Carbon RD1/4 10(J)	1
1-R14	ER212681	Carbon RD1/4 330(J)	1
1-R15	ER371946	Carbon RD1/4 2k(J)	1
1-R16, 17	ER304290	Carbon RD1/4 10(J)	2
1-R18	ER380913	Carbon RD1/4 33(J)	1
1-R19	ER399060	Carbon RD1/4 9.1k(J)	1
1-R20	ER347073	Carbon RD1/4 200(J)	1
1-R21, 22	ER211465	Carbon RD1/4 1k(J)	2
1-R23	ER211667	Carbon RD1/4 100(J)	1
1-R24	ER211858	Carbon RD1/4 12k(J)	1
1-R25	ER349907	Carbon RD1/4 33k(J)	1
1-R26	ER211757	Carbon RD1/4 100k(J)	1
1-R27	ER212264	Carbon RD1/4 22k(J)	1
1-R28	ER430086	Carbon RD1/4 560k(J)	1
1-R29	ER349907	Carbon RD1/4 33k(J)	1
1-R30	ER392850	Carbon RD1/4 390k(J)	1
1-R31	ER336442	Carbon RD1/4 10k(J)	1
1-R32	ER212477	Carbon RD1/4 3.3k(J)	1
1-R33	ER211858	Carbon RD1/4 12k(J)	1
1-R34	ER212681	Carbon RD1/4 330(J)	1
1-R35, 36	ER336442	Carbon RD1/4 10k(J)	2
1-R37	ER357456	Carbon RD1/4 2.2k(J)	1
1-R38	ER211465	Carbon RD1/4 1k(J)	1
1-R39	ER212264	Carbon RD1/4 22k(J)	1
1-R40	ER211667	Carbon RD1/4 100(J)	1
1-R41	ER342933	Carbon RD1/4 27k(J)	1
1-R42	ER212883	Carbon RD1/4 4.7k(J)	1
1-R43	ER357570	Carbon RD1/4 150k(J)	1
1-R44	ER304290	Carbon RD1/4 10(J)	1
1-R45	ER357456	Carbon RD1/4 2.2k(J)	1
1-R46	ER211465	Carbon RD1/4 1k(J)	1
1-R47	ER211757	Carbon RD1/4 100k(J)	1
1-R48	ER304290	Carbon RD1/4 10(J)	1
1-R49	ER211667	Carbon RD1/4 100(J)	1
1-R50, 51	ER211465	Carbon RD1/4 1k(J)	2
1-R52	ER211667	Carbon RD1/4 100(J)	1
1-R53	ER419556	Carbon RD1/4 43k(J)	1
1-R54	ER336442	Carbon RD1/4 10k(J)	1
1-R55	ER407316	Carbon RD1/4 24k(J)	1
1-R56, 57	ER211465	Carbon RD1/4 1k(J)	2
1-R58	ER211667	Carbon RD1/4 100(J)	1
1-R59	ER304402	Carbon RD1/4 470(J)	1
1-R60	ER306887	Carbon RD1/4 15k(J)	1
1-R61	ER556784	Carbon RD1/4 91k(J)	1
1-R62	ER357456	Carbon RD1/4 2.2k(J)	1

When ordering parts, please describe Parts Number, Serial Number, and Model Number in detail.

FIG. 2 PHOTO OF MPX P.C. BOARD (94-5008)



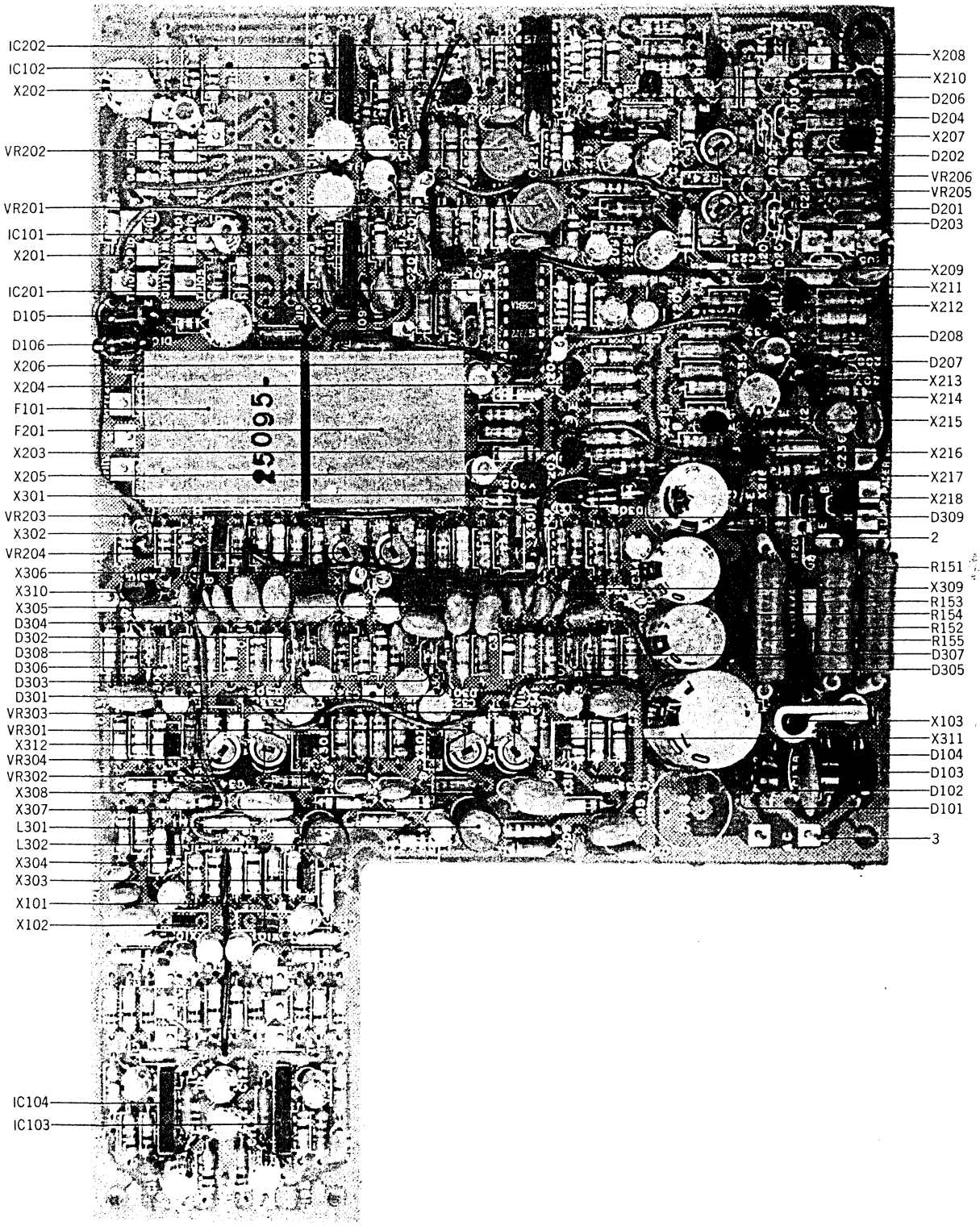
MPX P.C. BOARD (94-5008) BLOCK

Symbol No.	Parts No.	Description	Q'ty
2-1x	BA574795	MPX P.C. Board Comp. (94-5008)	1
2-IC1	EI443744	I.C. LA-3300	1
2-TR1	ET552870	FET 2SK30(Y) (GR)	1
2-TR2, 3	ET453486	Transistor 2SC711(E) (F)	2
2-TR4, 5	ET539987	Transistor 2SC1312 (F) (G)	2
2-D1, 2	ED219464	Germanium Diode 1N34A	2
2-L1	EO443766	Coil (19 KC) 02-1070-03 1070(Black)	1
2-L2	EO443777	Coil (38 KC) 02-1064-03 1064(White)	1
2-FL1, 2	ER512201	Filter FR-24	2
2-SW1	ES513922	Slide SW. SSB02242	1
2-2	EJ539662	Wrapping Post 1x17	15
		Capacitor, Vertical Type	
2-C1	EC331828	Elect. 3.3μF 25WV	1
2-C2	EC250841	Mylar 0.01μF(J) 50WV	1
2-C3	EC313244	Elect. 1μF 16WV	1
2-C4	EC331828	Elect. 3.3μF 25WV	1
2-C5	EC339096	Elect. 470μF 16WV	1
2-C6	EC389474	Mylar 0.0015μF(J) 50WV	1
2-C7	EC350706	Elect. 4.7μF 16WV	1
2-C8, 9	EC220432	Elect. 2.2μF 25WV	2
2-C10, 11	EC337500	Mylar 0.0047μF(J) 50WV	2
2-C12, 13	EC250975	Mylar 0.015μF(J) 50WV	2
2-C14, 15	EC220432	Elect. 2.2μF 25WV	2
2-C16, 17	EC551463	Ceramic DD600YW 0.001μF(Z) 50WV	2
2-C18, 19	EC350706	Elect. 4.7μF 16WV	2
2-C20, 21	EC380621	Mylar 0.0068μF(J) 50WV	2

Symbol No.	Parts No.	Description	Q'ty
		Resistor, Stopper Type	
2-R1	ER346994	Carbon RD1/4 18k(J)	1
2-R2	ER357491	Carbon RD1/4 82k(J)	1
2-R3	ER496214	Carbon RD1/4 360k(J)	1
2-R4	ER419040	Carbon RD1/4 1M(J)	1
2-R5	ER357491	Carbon RD1/4 82k(J)	1
2-R6	ER496214	Carbon RD1/4 360k(J)	1
2-R7	ER336442	Carbon RD1/4 10k(J)	1
2-R8	ER211465	Carbon RD1/4 1k(J)	1
2-R9, 10	ER343078	Carbon RD1/4 2.7k(J)	2
2-R11	ER357456	Carbon RD1/4 2.2k(J)	1
2-R12, 13	ER346601	Carbon RD1/4 47k(J)	2
2-R14, 15	ER211465	Carbon RD1/4 1k(J)	2
2-R16 to 19	ER380711	Carbon RD1/4 220k(J)	4
2-R20, 21	ER212883	Carbon RD1/4 4.7k(J)	2
2-R22, 23	ER371946	Carbon RD1/4 2k(J)	2
2-R24	ER212681	Carbon RD1/4 330(J)	1
2-R25, 26	ER212883	Carbon RD1/4 4.7k(J)	2
2-R27, 28	ER346601	Carbon RD1/4 47k(J)	2
2-R29, 30	ER357535	Carbon RD1/4 39k(J)	2

When ordering parts, please describe Parts Number, Serial Number, and Model Number in detail.

FIG. 3 PHOTO OF CD-4 BOARD (TDM-7)

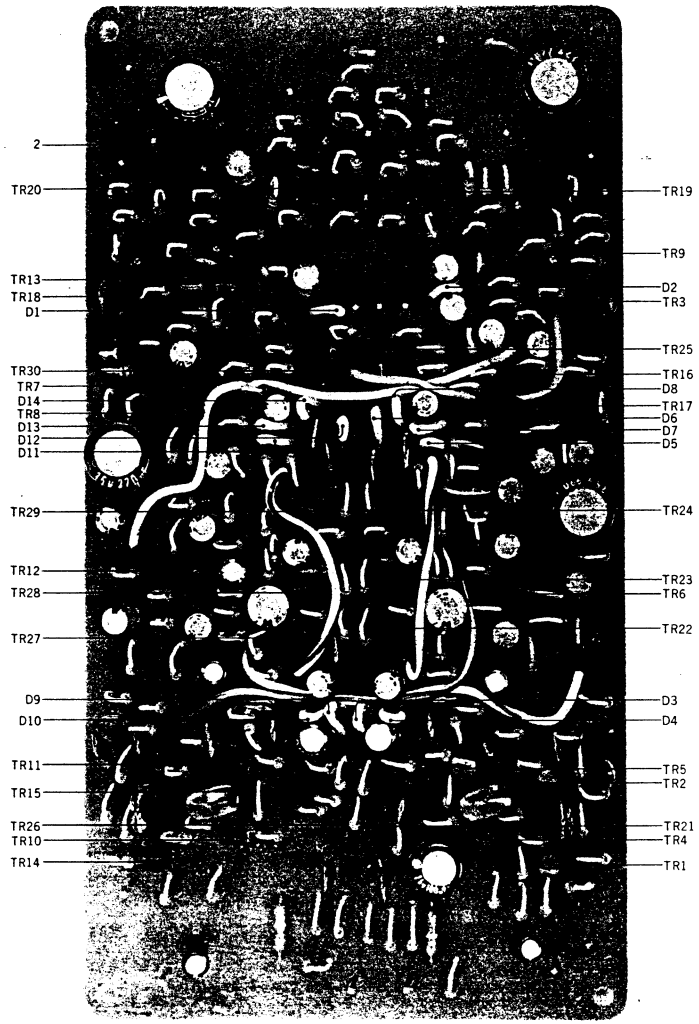


CD-4 P.C. BOARD (TDM-7) BLOCK

Symbol No.	Parts No.	Description	Q'ty
3-Ix	BA592266	CD-4 P.C. Board Comp. (TDM-7)	1
3-IC101, 2	EI716758	I.C. TA-7122P(B)	2
3-IC103, 4	EI716760	I.C. TA-7122P(A) (B) (C)	2
3-IC201, 2	EI716815	I.C. CD-894	2
3-X101, 2	ET234854	Transistor 2SC458LG(C)	2
3-X103	ET492827	Transistor 2SC853(L)	1
3-X201, 2	ET399881	Transistor 2SC711(F)	2
3-X203 to 6	ET516554	Transistor 2SA628(E)	4
3-X207, 8	ET399881	Transistor 2SC711(F)	2
3-X209, 10	ET552870	FET 2SK30(Y) (GR)	2
3-X211to17	ET380834	Transistor 2SC711(E)	7
3-X218	ET520301	Transistor 2SC628(F)	1
3-X301 to 4	ET234854	Transistor 2SC458LG(C)	4
3-X305, 6	ET399881	Transistor 2SC711(F)	2
3-X307, 8	ET716962	FET 2SK40(2)	2
3-X309, 10	ET399881	Transistor 2SC711(F)	2
3-X311, 12	ET716951	FET 2SK40(1)	2
3-D101 to 4	ED717041	Zener Diode FR2-02	4
3-D105, 6	ED716826	Zener Diode ZB-1-12	2
3-D107, 8	ED562397	Germanium Diode 1SI88FM-1	2
3-D201 to 4	ED713867	Silicon Diode IS990	4
3-D206	ED716826	Zener Diode ZB-1-12	1
3-D207, 8	ED713867	Silicon Diode 1S990	2
3-D301 to 8	ED562397	Germanium Diode 1S188FM-1	8
3-D309	ED716826	Zener Diode ZB-1-12	1
3-F101	ER716771	L.P.F. EO3427-003	1
3-P201	ER716771	L.P.F. EO3427-003	1
3-L301, 2	EO716984	Ferri Inductor 104K 100 MH	2
3-VR201, 2	EV716927	Semi-fixed/Vol. EO3511-222	2
3-VR203, 4	EV716938	Semi-fixed/Vol. VP8AOB-053	2
3-VR205, 6	EV716940	Semi-fixed/Vol. VP8AOB-014	2
3-VR301to4	EV716995	Semi-fixed/Vol. VP8AOB-024	4
3-2	EZ717107	Test Point AS40122-1	8
3-3	EZ717118	Wrapping Post E43727-002	30
		Capacitor, Vertical Type	
3-C101, 2	EC320051	Elect. 10μF 16WV	2
3-C103, 4	EC220678	Elect. 47μF 25WV	2
3-C105, 6	EC716804	Ceramic 330PF(J) 50WV	2
3-C107, 8	EC220364	Elect. 100μF 6.3WV	2
3-C109, 10	EC716782	Ceramic 5PF(J) 50WV	2
3-C111, 12	EC379157	Mylar 0.033μF(J) 50WV	2
3-C113, 14	EC716793	Ceramic 47PF(J) 50WV	2
3-C115, 16	EC220994	Elect. 10μF 25WV	2
3-C117, 18	EC379170	Mylar 0.1μF(J) 50WV	2
3-C119, 20	EC716793	Ceramic 47PF(J) 50WV	2
3-C121, 22	EC460708	Elect. 33μF 6.3WV	2
3-C123, 24	EC331828	Elect. 3.3μF 25WV	2
3-C125, 26	EC250885	Mylar 0.01μF(K) 50WV	2
3-C127to32	EC313108	Elect. 1μF 50WV	6
3-C133	EC321221	Elect. 100μF 50WV	1
3-C134	EC372148	Elect. 220μF 35WV	1
3-C135	EC321221	Elect. 100μF 50WV	1
3-C137	EC564952	Elect. 470μF 50WV	1
3-C138	EC717052	Ceramic 0.01μF(P)	1
3-C201, 2	EC716883	Mylar 1000PF 50WV	2
3-C203, 4	EC716916	Ceramic 470PF(J) 50WV	2
3-C205, 6	EC716905	Mylar 2200PF 50WV	2
3-C207, 8	EC250975	Mylar 0.015μF(J) 50WV	2
3-C209, 10	EC313108	Elect. 1μF 50WV	2
3-C211, 12	EC716872	Mylar 2700PF 50WV	2
3-C213	EC320051	Elect. 10μF 16WV	1
3-C215, 16	EC716872	Mylar 2700PF 50WV	2
3-C217, 18	EC313108	Elect. 1μF 50WV	2
3-C219, 20	EC717120	Tantalum 2.2μF 25WV	2
3-C221, 22	EC716894	Mylar 1200PF 50WV	2
3-C223, 24	EC716883	Mylar 1000PF 50WV	2
3-C225, 26	EC450281	Elect. 0.47μF 50WV	2
3-C227, 28	EC716861	Mylar 3300PF 50WV	2
3-C229, 30	EC320051	Elect. 10μF 16WV	2
3-C231	EC716905	Mylar 2200PF 50WV	1
3-C232	EC379157	Mylar 0.033μF(J) 50WV	1
3-C233	EC450281	Elect. 0.47μF 50WV	1
3-C234	EC379214	Mylar 0.047μF(J) 50WV	1
3-C235	EC220612	Elect. 33μF 25WV	1
3-C236	EC220994	Elect. 10μF 25WV	1
3-C301, 2	EC331828	Elect. 3.3μF 25WV	2
3-C303, 4	EC717006	Mylar 3900PF 50WV	2
3-C305, 6	EC379170	Mylar 0.1μF(J) 50WV	2
3-C307, 8	EC311793	Mylar 0.012μF(J) 50WV	2
3-C309, 10	EC717017	Mylar 4700PF 50WV	2
3-C311, 12	EC717030	Elect. 10.68μF 16WV	2
3-C313, 14	EC368370	Mylar 0.15μF(J) 50WV	2
3-C315, 16	EC368335	Mylar 0.022μF(J) 50WV	2
3-C317to20	EC389496	Mylar 0.068μF(J) 50WV	4
3-C321, 22	EC311793	Mylar 0.012μF(J) 50WV	2
3-C323, 24	EC389496	Mylar 0.068μF(J) 50WV	2
3-C325, 26	EC717028	Elect. 0.22μF 16WV	2
3-C327, 28	EC368335	Mylar 0.022μF(J) 50WV	2
3-C329, 30	EC307664	Elect. 33μF 6.3WV	2
3-C331, 32	EC389485	Mylar 0.018μF(J) 50WV	2
3-C333, 34	EC717017	Mylar 4700PF 50WV	2
3-C335, 36	EC379192	Mylar 0.039μF(J) 50WV	2
3-C337, 38	EC438041	Mylar 0.082μF(J) 50WV	2
3-C339, 40	EC717017	Mylar 4700PF 50WV	
3-C341, 42	EC450527	Elect. 4.7μF 25WV	2
3-C343	EC220961	Elect. 10μF 10WV	1
		Resistor, Insulator Type	
3-R101, 2	ER514844	Carbon RD1/4 560k(J)	2
3-R103, 4	ER324641	Carbon RD1/4 1k(J)	2
3-R105, 6	ER213794	Carbon RD1/4 120k(J)	2
3-R107, 8	ER365016	Carbon RD1/4 220k(J)	2
3-R109, 10	ER213715	Carbon RD1/4 100k(J)	2
3-R111, 12	ER345677	Carbon RD1/4 15k(J)	2
3-R113, 14	ER345756	Carbon RD1/4 68k(J)	2
3-R115, 16	ER213647	Carbon RD1/4 10k(J)	2
3-R117, 18	ER214290	Carbon RD1/4 4.7k(J)	2
3-R119, 20	ER315213	Carbon RD1/4 8.2k(J)	2
3-R121, 22	ER324641	Carbon RD1/4 1k(J)	2
3-R123, 24	ER213715	Carbon RD1/4 100k(J)	2
3-R125, 26	ER450101	Carbon RD1/4 330k(J)	2
3-R127, 28	ER324685	Carbon RD1/4 33k(J)	2
3-R129, 30	ER329343	Carbon RD1/4 390(J)	2
3-R131, 32	ER214536	Carbon RD1/4 6.8k(J)	2
3-R133, 34	ER213873	Carbon RD1/4 150k(J)	2
3-R135to42	ER213647	Carbon RD1/4 10k(J)	8
3-R143to46	ER324641	Carbon RD1/4 1k(J)	4
3-R147, 48	ER443790	Carbon RD1/4 470k(J)	2
3-R149, 50	ER365016	Carbon RD1/4 220k(J)	2
3-R151	ER717085	Metal Oxide Film 3W 1.5k(K)	1
3-R152	ER339131	Metal Oxide Film 3W 820(K)	1
3-R153	ER717096	Metal Oxide Film 1W 1.2k(K)	1
3-R154	ER717074	Metal Oxide Film 2W 120(K)	1
3-R155	ER717063	Metal Oxide Film 3W 270(K)	1
3-R156	ER229555	Solid RC1/4 1.2k(K)	1
3-R201, 2	ER430211	Carbon RD1/4 3.9k(J)	2
3-R203, 4	ER450101	Carbon RD1/4 330k(J)	2
3-R205, 6	ER345712	Carbon RD1/4 22k(J)	2
3-R207, 8	ER214290	Carbon RD1/4 4.7k(J)	2
3-R209, 10	ER427950	Carbon RD1/4 180(J)	2
3-R211, 12	ER345677	Carbon RD1/4 15k(J)	2
3-R213to16	ER213647	Carbon RD1/4 10k(J)	4
3-R217to20	ER324764	Carbon RD1/4 560(J)	4
3-R221, 22	ER334923	Carbon RD1/4 2.7k(J)	2
3-R223, 24	ER716848	Carbon RD1/4 0	2
3-R225, 26	ER324685	Carbon RD1/4 33k(J)	2
3-R227, 28	ER443790	Carbon RD1/4 470k(J)	2
3-R229, 30	ER406034	Carbon RD1/4 220(J)	2
3-R231, 32	ER214290	Carbon RD1/4 4.7k(J)	2
3-R233, 34	ER313647	Carbon RD1/4 10k(J)	2
3-R235, 36	ER214536	Carbon RD1/4 6.8k(J)	2
3-R237, 38	ER450101	Carbon RD1/4 330k(J)	2
3-R239, 40	ER364983	Carbon RD1/4 18k(J)	2
3-R241, 42	ER213715	Carbon RD1/4 100k(J)	2
3-R243, 44	ER315213	Carbon RD1/4 8.2k(J)	2
3-R245, 46	ER430165	Carbon RD1/4 150(J)	2
3-R249, 50	ER430255	Carbon RD1/4 56k(J)	2
3-R251, 52	ER364948	Carbon RD1/4 3.3k(J)	2
3-R253	ER213794	Carbon RD1/4 120k(J)	1
3-R254	ER345756	Carbon RD1/4.68k(J)	1
3-R255	ER348480	Carbon RD1/4 12k(J)	1

Symbol No.	Parts No.	Description	Q'ty
3-R256	ER364950	Carbon RD1/4 330(J)	1
3-R257	ER440921	Carbon RD1/4 27k(J)	1
3-R258	ER214290	Carbon RD1/4 4.8k(J)	1
3-R259	ER430288	Carbon RD1/4 680(J)	1
3-R260	ER213715	Carbon RD1/4 100k(J)	1
3-R261, 62	ER324685	Carbon RD1/4 33k(J)	2
3-R263	ER345712	Carbon RD1/4 22k(J)	1
3-R264	ER315213	Carbon RD1/4 8.2k(J)	1
3-R265	ER345712	Carbon RD1/4 22k(J)	1
3-R266	ER324808	Carbon RD1/4 100(J)	1
3-R267	ER345712	Carbon RD1/4 22k(J)	1
3-R268	ER324720	Carbon RD1/4 5.6k(J)	1
3-R269	ER324685	Carbon RD1/4 33k(J)	1
3-R270	ER345712	Carbon RD1/4 22k(J)	1
3-R271	ER365016	Carbon RD1/4 220k(J)	1
3-R272	ER329308	Carbon RD1/4 47k(J)	1
3-R273	ER716850	Solid RD1/4 270(K)	1
3-R301, 2	ER368223	Carbon RD1/4 270k(J)	2
3-R303, 4	ER430255	Carbon RD1/4 56k(J)	2
3-R305, 6	ER329308	Carbon RD1/4 47k(J)	2
3-R307to10	ER214290	Carbon RD1/4 4.7k(J)	4
3-R311, 12	ER345712	Carbon RD1/4 22k(J)	2
3-R313, 14	ER324720	Carbon RD1/4 5.6k(J)	2
3-R315, 16	ER348480	Carbon RD1/4 12k(J)	2
3-R317, 18	ER315213	Carbon RD1/4 8.2k(J)	2
3-R319, 20	ER364948	Carbon RD1/4 3.3k(J)	2
3-R321, 22	ER364950	Carbon RD1/4 330(J)	2
3-R323, 24	ER430165	Carbon RD1/4 150(J)	2
3-R325, 26	ER214536	Carbon RD1/4 6.8k(J)	2
3-R327, 28	ER364983	Carbon RD1/4 18k(J)	2
3-R329, 30	ER430233	Carbon RD1/4 390k(J)	2
3-R331, 32	ER329308	Carbon RD1/4 47k(J)	2
3-R333, 34	ER315213	Carbon RD1/4 8.2k(J)	2
3-R335, 36	ER324808	Carbon RD1/4 100(J)	2
3-R337, 38	ER443790	Carbon RD1/4 470k(J)	2
3-R339, 40	ER213873	Carbon RD1/4 150k(J)	2
3-R341, 42	ER213715	Carbon RD1/4 100k(J)	2
3-R343, 44	ER440921	Carbon RD1/4 27k(J)	2
3-R345, 46	ER315213	Carbon RD1/4 8.2k(J)	2
3-R347, 48	ER368223	Carbon RD1/4 270k(J)	2
3-R349, 50	ER364994	Carbon RD1/4 39k(J)	2
3-R351, 52	ER214290	Carbon RD1/4 4.7k(J)	2
3-R353, 54	ER430143	Carbon RD1/4 120(J)	2
3-R355, 56	ER345756	Carbon RD1/4 68k(J)	2
3-R357, 58	ER324685	Carbon RD1/4 33k(J)	2
3-R359to62	ER213715	Carbon RD1/4 100k(J)	4
3-R363, 64	ER440921	Carbon RD1/4 27k(J)	2
3-R365	ER229757	Solid RC1/4 2.7k(J)	1
3-R366	ER345712	Carbon RD1/4 22k(J)	1
3-R367	ER230038	Solid RC1/4 680(K)	1
3-R501, 2	ER564052	Carbon RD1/4 680k(J)	2
3-R503, 4	ER514844	Carbon RD1/4 560k(J)	2
3-R505, 6	ER443790	Carbon RD1/4 470k(J)	2

FIG. 4 PHOTO OF SQ P.C. BOARD (98-5015)



SQ P.C. BOARD (98-5015) BLOCK

Symbol No.	Parts No.	Description	Q'ty
4-1x	BA560643	SQ P.C. Board Comp. (98-5015)	1
A-TR1 to 6	ET539987	Transistor 2SC1312(F) (G)	6
4-TR7, 8	ET453486	Transistor 2SC711(E) (F)	2
4-TR9to15	ET539987	Transistor 2SC1312(F) (G)	7
4-TR16,17	ET557965	Transistor 2SA733(Q) (R)	2
4-TR18to20	ET539987	Transistor 2SC1312(F) (G)	3
4-TR21to24	ET453486	Transistor 2SC711(E) (F)	4
4-TR25	ET557965	Transistor 2SA733(Q) (R)	1
4-TR26 to 30	ET453486	Transistor 2SC711(E) (F)	5
4-D1 to 14	ED219464	Germanium Diode 1N34A	14
4-2	EJ539662	Wrapping Post 1x17	20
		Capacitor, Vertical Type	
4-C1	EC220151	Elect. 100μF 25WV	1
4-C2	EC368357	Mylar 0.056μF(J) 50WV	1
4-C3	EC329883	Mylar 0.0056μF(J) 50WV	1
4-C4	EC379721	Mylar 0.0012μF(J) 50WV	1
4-C5	EC350875	Mylar 0.001μF(J) 50WV	1
4-C6	EC313108	Elect. 1μF 50WV	1
4-C7	EC372148	Elect. 220μF 35WV	1
4-C8, 9	EC313108	Elect. 1μF 50WV	2
4-C10	EC377212	VFM 47PF(J) 50WV	1
4-C11	EC522516	Tantalum 1μF(M) 25WV	1
4-C12	EC313108	Elect. 1μF 50WV	1
4-C13	EC538435	Mylar 0.22μF(J) 50WV	1
4-C14	EC368335	Mylar 0.022μF(J) 50WV	1
4-C15	EC337500	Mylar 0.0047μF(J) 50WV	1
4-C16	EC313108	Elect. 1μF 50WV	1
4-C17	EC329883	Mylar 0.0056μF(J) 50WV	1
4-C18to22	EC313108	Elect. 1μF 50WV	5
4-C23	EC377212	VFM 47PF(J) 50WV	1
4-C24	EC522516	Tantalum 1μF(M) 25WV	1
4-C25	EC313108	Elect. 1μF 50WV	1
4-C26	EC538435	Mylar 0.22μF(J) 50WV	1
4-C27	EC368335	Mylar 0.022μF(J) 50WV	1
4-C28	EC338500	Mylar 0.0047μF(J) 50WV	1
4-C29	EC329883	Mylar 0.0056μF(J) 50WV	1
4-C30to32	EC313108	Elect. 1μF 50WV	1
4-C33	EC320051	Elect. 10μF 16WV	1
4-C34	EC372148	Elect. 220μF 35WV	1
4-C35, 36	EC313108	Elect. 1μF 50WV	2
4-C37	EC377212	VFM 47PF(J) 50WV	1
4-C38	EC522516	Tantalum 1μF(M) 25WV	1
4-C39	EC368357	Mylar 0.056μF(J) 50WV	1
4-C40	EC329883	Mylar 0.056μF(J) 50WV	1
4-C41	EC379721	Mylar 0.0012μF(J) 50WV	1
4-C42	EC350875	Mylar 0.001μF(J) 50WV	1
4-C43to46	EC313108	Elect. 1μF 50WV	4
4-C47	EC377212	VFM 47PF(J) 50WV	1
4-C48	EC522516	Tantalum 1μF(M) 25WV	1
4-C49, 50	EC372148	Elect. 220μF 35WV	2
4-C51, 52	EC313108	Elect. 1μF 50WV	2
4-C53, 54	EC377212	VFM 47PF(J) 50WV	2
4-C55, 56	EC522516	Tantalum 1μF(M) 25WV	2
4-C57, 58	EC250841	Mylar 0.01μF(J) 50WV	2
4-C59	EC377212	VFM 47PF(J) 50WV	1
4-C60	EC331738	Elect. 4.7μF 50WV	1
4-C61	EC336104	Elect. 100μF 6.3WV	1
4-C62, 63	EC313108	Elect. 1μF 50WV	2
4-C64, 65	EC379192	Mylar 0.039μF(J) 50WV	2
4-C66	EC313108	Elect. 1μF 50WV	1
4-C67, 68	EC250841	Mylar 0.01μF(J) 50WV	2
4-C69	EC377212	VFM 47PF(J) 50WV	1
4-C70	EC331738	Elect. 4.7μF 50WV	1
4-C71	EC336104	Elect. 100μF 6.3WV	1
4-C72, 73	EC313108	Elect. 1μF 50WV	2
4-C74, 75	EC379192	Mylar 0.039μF(J) 50WV	2
4-C76	EC313108	Elect. 1μF 50WV	1
		Resistor, Stopper Type	
4-R1	ER212264	Carbon RD1/4 22k(J)	1
4-R2	ER306887	Carbon RD1/4 15k(J)	1
4-R3	ER306843	Carbon RD1/4 1.2k(J)	1
4-R4, 5	ER212883	Carbon RD1/4 4.7k(J)	2
4-R6	ER212264	Carbon RD1/4 22k(J)	1
4-R7, 8	ER357456	Carbon RD1/4 2.2k(J)	2

Symbol No.	Parts No.	Description	Q'ty
4-R9	ER346544	Carbon RD1/4 3k(J)	1
4-R10	ER407316	Carbon RD1/4 24k(J)	1
4-R11	ER346994	Carbon RD1/4 18k(J)	1
4-R12	ER357491	Carbon RD1/4 82k(J)	1
4-R13	ER349907	Carbon RD1/4 33k(J)	1
4-R14	ER342933	Carbon RD1/4 27k(J)	1
4-R15	ER211667	Carbon RD1/4 100(J)	1
4-R16	ER420232	Carbon RD1/4 7.5k(J)	1
4-R17	ER346601	Carbon RD1/4 47k(J)	1
4-R18	ER213030	Carbon RD1/4 5.6k(J)	1
4-R19	ER357570	Carbon RD1/4 150k(J)	1
4-R20	ER212883	Carbon RD1/4 4.7k(J)	1
4-R21	ER350065	Carbon RD1/4 430(J)	1
4-R22	ER211757	Carbon RD1/4 100K(J)	1
4-R23	ER211320	Carbon RD1/4 1.5k(J)	1
4-R24	ER407316	Carbon RD1/4 24k(J)	1
4-R25	ER336442	Carbon RD1/4 10k(J)	1
4-R26	ER336442	Carbon RD1/4 10k(J)	1
4-R27	ER514844	Carbon RD1/4 560k(J)	1
4-R28	ER357570	Carbon RD1/4 150k(J)	1
4-R29	ER306843	Carbon RD1/4 1.2k(J)	1
4-R30, 31	ER212883	Carbon RD1/4 4.7k(J)	2
4-R32	ER212264	Carbon RD1/4 22k(J)	1
4-R33, 34	ER357456	Carbon RD1/4 2.2k(J)	2
4-R35	ER346544	Carbon RD1/4 3k(J)	1
4-R36	ER407316	Carbon RD1/4 24k(J)	1
4-R37	ER306887	Carbon RD1/4 15k(J)	1
4-R38	ER346601	Carbon RD1/4 47k(J)	1
4-R39	ER419556	Carbon RD1/4 43k(J)	1
4-R40	ER380711	Carbon RD1/4 220k(J)	1
4-R41	ER211757	Carbon RD1/4 100k(J)	1
4-R42, 43	ER336442	Carbon RD1/4 10k(J)	2
4-R44, 45	ER342933	Carbon RD1/4 27k(J)	2
4-R46	ER380755	Carbon RD1/4 6.2k(J)	1
4-R47	ER211757	Carbon RD1/4 100K(J)	1
4-R48	ER346601	Carbon RD1/4 47k(J)	1
4-R49	ER211757	Carbon RD1/4 100k(J)	1
4-R50	ER419040	Carbon RD1/4 1M(J)	1
4-R51	ER336442	Carbon RD1/4 10k(J)	1
4-R52	ER346601	Carbon RD1/4 47k(J)	1
4-R53	ER213030	Carbon RD1/4 5.6k(J)	1
4-R54	ER357570	Carbon RD1/4 150k(J)	1
4-R55,56	ER350065	Carbon RD1/4 430(J)	2
4-R57	ER211757	Carbon RD1/4 100k(J)	1
4-R58	ER211320	Carbon RD1/4 1.5k(J)	1
4-R59	ER357535	Carbon RD1/4 39k(J)	1
4-R60	ER336442	Carbon RD1/4 10k(J)	1
4-R61	ER514844	Carbon RD1/4 560k(J)	1
4-R62	ER357570	Carbon RD1/4 150k(J)	1
4-R63	ER306843	Carbon RD1/4 1.2k(J)	1
4-R64, 65	ER212883	Carbon RD1/4 4.7k(J)	1
4-R66	ER212264	Carbon RD1/4 22k(J)	1
4-R67, 68	ER357456	Carbon RD1/4 2.2k(J)	2
4-R69	ER346544	Carbon RD1/4 3k(J)	1
4-R70	ER407316	Carbon RD1/4 24k(J)	1
4-R71	ER306887	Carbon RD1/4 15k(J)	1
4-R72	ER349907	Carbon RD1/4 33k(J)	1
4-R73	ER357491	Carbon RD1/4 82k(J)	1
4-R74	ER380711	Carbon RD1/4 220k(J)	1
4-R75	ER211757	Carbon RD1/4 100k(J)	1
4-R76, 77	ER336442	Carbon RD1/4 10k(J)	2
4-R78	ER430020	Carbon RD1/4 13k(J)	1
4-R79	ER306887	Carbon RD1/4 15k(J)	1
4-R80	ER342933	Carbon RD1/4 27k(J)	1
4-R81	ER380755	Carbon RD1/4 6.2k(J)	1
4-R82	ER211667	Carbon RD1/4 100(J)	1
4-R83	ER346601	Carbon RD1/4 47k(J)	1
4-R84	ER213030	Carbon RD1/4 5.6k(J)	1
4-R85	ER357570	Carbon RD1/4 150k(J)	1
4-R86	ER212883	Carbon RD1/4 4.7k(J)	1
4-R87	ER350065	Carbon RD1/4 430(J)	1
4-R88	ER211757	Carbon RD1/4 100k(J)	1
4-R89	ER211320	Carbon RD1/4 1.5k(J)	1
4-R90	ER357535	Carbon RD1/4 39k(J)	1
4-R91	ER306843	Carbon RD1/4 1.2k(J)	1

When ordering parts, please describe Parts Number, Serial Number, and Model Number in detail.

SQ P.C. BOARD (98-5015) BLOCK

Symbol No.	Parts No.	Description	Q'ty
4-R92, 93	ER212883	Carbon RD1/4 4.7k(J)	2
4-R94	ER212264	Carbon RD1/4 22k(J)	1
4-R95, 96	ER357456	Carbon RD1/4 2.2k(J)	2
4-R97	ER346544	Carbon RD1/4 3k(J)	1
4-R98	ER407316	Carbon RD1/4 24k(J)	1
4-R99	ER420322	Carbon RD1/4 36k(J)	1
4-R100	ER346994	Carbon RD1/4 18k(J)	1
4-R101, 2	ER342933	Carbon RD1/4 27k(J)	2
4-R103	ER420232	Carbon RD1/4 7.5k(J)	1
4-R104	ER211757	Carbon RD1/4 100k(J)	1
4-R105	ER346601	Carbon RD1/4 47k(J)	1
4-R106	ER211757	Carbon RD1/4 100k(J)	1
4-R107	ER419040	Carbon RD1/4 1M(J)	1
4-R108	ER336442	Carbon RD1/4 10k(J)	1
4-R109	ER346601	Carbon RD1/4 47k(J)	1
4-R110	ER213030	Carbon RD1/4 5.6k(J)	1
4-R111	ER357570	Carbon RD1/4 150k(J)	1
4-R112	ER212883	Carbon RD1/4 4.7k(J)	1
4-R113	ER350065	Carbon RD1/4 430(J)	1
4-R114	ER211757	Carbon RD1/4 100k(J)	1
4-R115	ER211320	Carbon RD1/4 1.5k(J)	1
4-R116	ER407316	Carbon RD1/4 24k(J)	1
4-R117	ER342933	Carbon RD1/4 27k(J)	1
4-R118	ER346601	Carbon RD1/4 47k(J)	1
4-R119, 20	ER213030	Carbon RD1/4 5.6k(J)	2
4-R121	ER346601	Carbon RD1/4 47k(J)	1
4-R122, 23	ER357570	Carbon RD1/4 150k(J)	2
4-R124	ER352045	Carbon RD1/4 3.9k(J)	1
4-R125, 26	ER349784	Carbon RD1/4 390(J)	2
4-R127	ER352045	Carbon RD1/4 3.9k(J)	1
4-R128, 29	ER211757	Carbon RD1/4 100k(J)	2
4-R130, 31	ER395460	Carbon RD1/4 1.3k(J)	2
4-R132, 33	ER357535	Carbon RD1/4 39k(J)	2
4-R134	ER211667	Carbon RD1/4 100(J)	1
4-R135	ER343078	Carbon RD1/4 2.7k(J)	1
4-R136	ER211667	Carbon RD1/4 100(J)	1
4-R137, 38	ER211757	Carbon RD1/4 100k(J)	2
4-R139	ER304402	Carbon RD1/4 470(J)	1
4-R140	ER336442	Carbon RD1/4 10k(J)	1
4-R141	ER426857	Carbon RD1/4 270k(J)	1
4-R142	ER211320	Carbon RD1/4 1.5k(J)	1
4-R143	ER361528	Carbon RD1/4 56k(J)	1
4-R144	ER419040	Carbon RD1/4 1M(J)	1
4-R145	ER342933	Carbon RD1/4 27k(J)	1
4-R146	ER336442	Carbon RD1/4 10k(J)	1
4-R147	ER430108	Carbon RD1/4 910(J)	1
4-R148	ER380711	Carbon RD1/4 220k(J)	1
4-R149	ER392850	Carbon RD1/4 390k(J)	1
4-R150	ER357570	Carbon RD1/4 150k(J)	1
4-R151	ER352045	Carbon RD1/4 3.9k(J)	1
4-R152	ER306843	Carbon RD1/4 1.2k(J)	1
4-R153	ER343078	Carbon RD1/4 2.7k(J)	1
4-R154	ER357570	Carbon RD1/4 150k(J)	1
4-R155	ER357456	Carbon RD1/4 2.2k(J)	1
4-R156,57,58	ER211757	Carbon RD1/4 100k(J)	3
4-R159	ER304402	Carbon RD1/4 470(J)	1
4-R160	ER336442	Carbon RD1/4 10k(J)	1
4-R161	ER426857	Carbon RD1/4 270k(J)	1
4-R162	ER211320	Carbon RD1/4 1.5k(J)	1
4-R163	ER361528	Carbon RD1/4 56k(J)	1
4-R164	ER419040	Carbon RD1/4 1M(J)	1
4-R165	ER342933	Carbon RD1/4 27k(J)	1
4-R166	ER336442	Carbon RD1/4 10k(J)	1
4-R167	ER430108	Carbon RD1/4 910(J)	1
4-R168	ER380711	Carbon RD1/4 220k(J)	1
4-R169	ER392850	Carbon RD1/4 390k(J)	1
4-R170	ER357570	Carbon RD1/4 150k(J)	1
4-R171	ER352045	Carbon RD1/4 3.9k(J)	1
4-R172	ER306843	Carbon RD1/4 1.2k(J)	1
4-R173	ER343078	Carbon RD1/4 2.7k(J)	1
4-R174	ER357570	Carbon RD1/4 150k(J)	1
4-R175	ER357456	Carbon RD1/4 2.2k(J)	1
4-R176	ER211757	Carbon RD1/4 100k(J)	1

MAIN AMP. P.C. BOARD (92-5005) BLOCK

Symbol No.	Parts No.	Description	Q'ty
5-1x	BA560610	Main Amp. P.C. Board Comp. (92-5005)	1
5-TR1	ET539987	Transistor 2SC1312(F) (G)	2
5-TR2, 3	ET551564	Transistor 2SC1124	4
5-TR4	ET556020	Transistor 2SA706-3(1) (2)	2
5-TR5, 6	ET557954	Transistor 2SC1402(G) (Y)	4
5-D1	ED556514	Varistor STV-3H	2
5-VR1	EV383398	Semi-fixed/Vol. V18K3-2 30 kB(4US)	2
5-VR2	EV409858	Semi-fixed/Vol. V18K3-2 100 ΩB(4US)	2
5-2	EJ550012	Wrapping Terminal T5280	12
5-3	EZ543003	Heat-sink D	1
5-4x	AA541552	Transistor Mt. Plate	4
5-5	ZS463454	ISO Screw, binding head 3x15	8
5-6x	ZW348107	ISO Nut M3	8
5-7x	ZW259593	Washer (BSP) D3.4x7.8x0.5t	8
5-8x	AA541563	Heat-sink Plate Mt. Parts	2
5-9x	ZS379405	ISO Screw, binding head 3x6	4
5-10	ZS321298	ISO Screw, binding head 3x8	2
5-11x	ZW426622	Washer (SPC) D3.4x7.8x0.5t	2
		Capacitor, Vertical Type	
5-C1	EC539943	Elect. 3.3μF 50WV	2
5-C2	EC290531	VFM 100PF(K) 50WV	2
5-C3	EC321221	Elect. 100μF 50WV	2
5-C4	EC539943	Elect. 3.3μF 50WV	2
5-C5	EC321221	Elect. 100μF 50WV	2
5-C6	EC290531	VFM 100PF(K) 50WV	2
5-C7	EC220364	Elect. 100μF 6.3WV	2
5-C8	EC556176	Elect. 2200μF 35WV	2
5-C9	EC487394	VFM 47PF(K) 50WV	2
5-C10	EC384085	Ceramic DB205YZ 0.022μF(Z) 50WV	2
5-C11	EC551160	Ceramic 0.01μF(Z) 1.4kWV	2
5-C12	EC290531	VFM 100PF(K) 50WV	2
		Resistor, Stopper Type	
5-R1	ER213715	Carbon RD1/4 100k(J) (Insu. Type)	2
5-R2	ER329264	Carbon RD1/4 2.2k(J)	2
5-R3	ER430007	Carbon RD1/4 1.5M(J)	2
5-R4	ER211757	Carbon RD1/4 100k(J)	2
5-R5	ER304402	Carbon RD1/4 470(J)	2
5-R6	ER346544	Carbon RD1/4 3k(J)	2
5-R7	ER433877	Carbon RD1/4 120(J)	2
5-R8	ER466582	Carbon RD1/2 820(J)	2
5-R9	ER212883	Carbon RD1/4 4.7k(J)	2
5-R10	ER357535	Carbon RD1/4 39k(J)	2
5-R11	ER212477	Carbon RD1/4 3.3k(J)	2
5-R12	ER212016	Carbon RD1/4 150(J)	2
5-R13	ER556042	Carbon RD1/2 22(J)	2
5-R14	ER212016	Carbon RD1/4 150(J)	2
5-R15	ER556042	Carbon RD1/4 22(J)	2
5-R16	ER212016	Carbon RD1/4 150(J)	2
5-R17,18	ER556064	Metal Plate MPC71F2 5W 0.47(K)	4
5-R19	ER306887	Carbon RD1/4 15k(J)	2
5-R20	ER213030	Carbon RD1/4 5.6k(J)	2
5-R21	ER452542	Carbon RD1/2 10(J)	2

When ordering parts, please describe Parts Number, Serial Number, and Model Number in detail.

FIG. 5 PHOTO OF MAIN AMP. P.C. BOARD (92-5005)

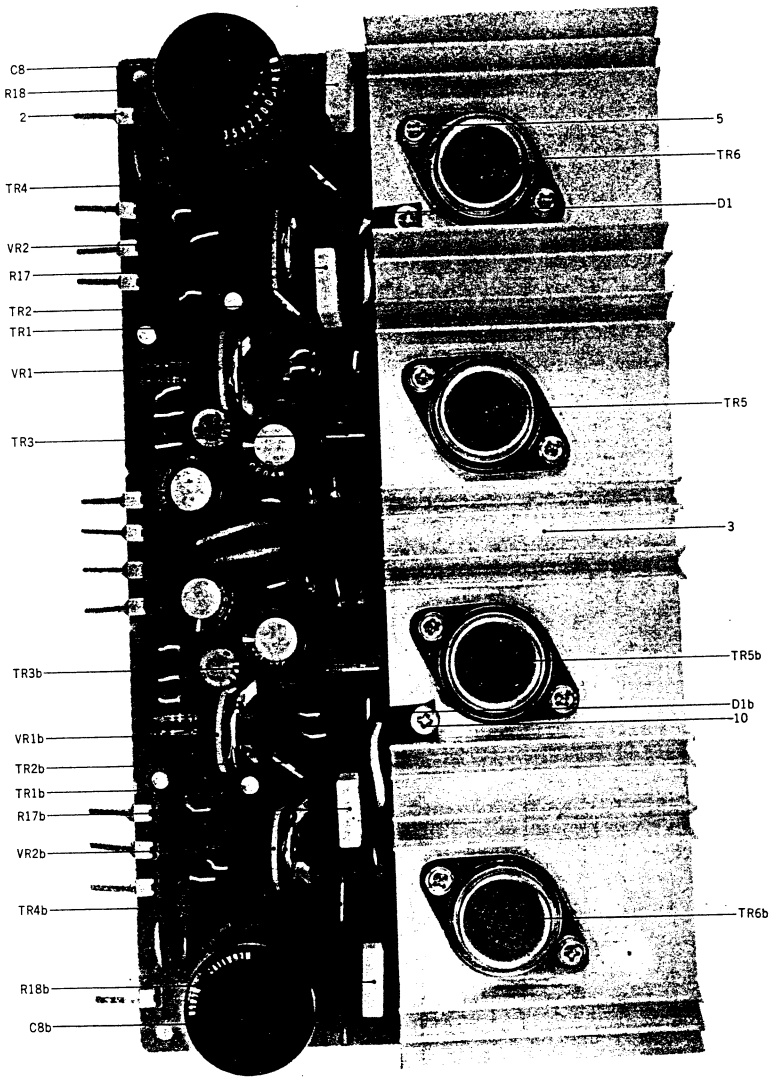
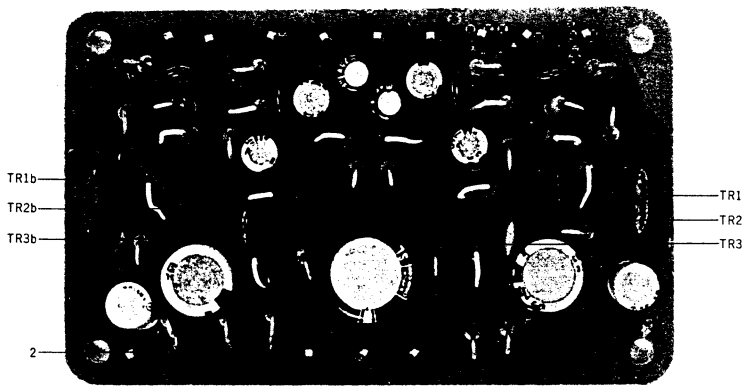


FIG. 6 PHOTO OF EQ. P.C. BOARD (98-5008)

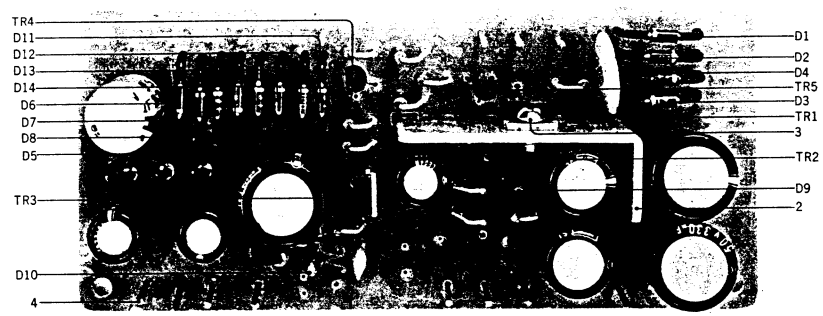


EQ. P.C. BOARD (98-5008) BLOCK

Symbol No.	Parts No.	Description	Q'ty
6-1x	BA560654	EQ. P.C. Board Comp. (98-5008)	1
6-TR1,2,3	ET539987	Transistor 2SC1312(F) (G)	6
6-2	EJ539662	Wrapping Post 1x17	13
		Capacitor, Vertical Type	
6-C1	EC517138	Elect. 10μF 25WV NL	2
6-C2	EC220678	Elect. 47μF 25WV	2
6-C3	EC329850	VFM 220PF(J) 50WV	2
6-C4	EC290520	VFM 100PF(J) 50WV	2
6-C5	EC377212	VFM 47PF(J) 50WV	2
6-C6	EC389474	Mylar 0.0015μF(J) 50WV	2
6-C7	EC329883	Mylar 0.0056μF(J) 50WV	2
6-C8	EC350706	Elect. 4.7μF 16WV	2
6-C9	EC450055	Elect. 1μF 25WV	2
6-C10	EC220432	Elect. 2.2μF 25WV	2
6-C11	EC313121	Elect. 220μF 25WV	2
		Resistor, Stopper Type	
6-R1	ER211465	Carbon RD1/4 1k(J)	2
6-R2	ER361528	Carbon RD1/4 56k(J)	2
6-R3	ER211950	Carbon RD1/4 130k(J)	2
6-R4	ER211465	Carbon RD1/4 1k(J)	2
6-R5	ER306887	Carbon RD1/4 15k(J)	2
6-R6	ER362272	Carbon RD1/4 200k(J)	2
6-R7	ER349907	Carbon RD1/4 33k(J)	2
6-R8	ER357456	Carbon RD1/4 2.2k(J)	2
6-R9, 10	ER212477	Carbon RD1/4 3.3k(J)	4
6-R11	ER430086	Carbon RD1/4 560k(J)	2
6-R12	ER357456	Carbon RD1/4 2.2k(J)	2
6-R13	ER346994	Carbon RD1/4 18k(J)	2
6-R14	ER346601	Carbon RD1/4 47k(J)	2
6-R15	ER213096	Carbon RD1/4 510(J)	2
6-R16	ER336442	Carbon RD1/4 10k(J)	2
6-R17	ER211465	Carbon RD1/4 1k(J)	2

When ordering parts, please describe Parts Number, Serial Number, and Model Number in detail.

FIG. 7 PHOTO OF REGULATOR P.C. BOARD (98-5084)

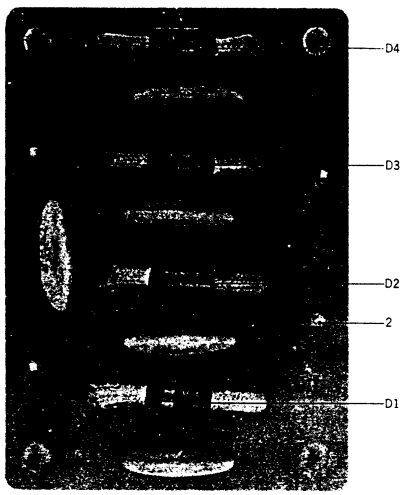


REGULATOR P.C. BOARD (98-5084) BLOCK

Symbol No.	Parts No.	Description	Q'ty
7-1x	BA570352	Regulator P.C. Board Comp. (98-5084)	1
7-TR1	ET557998	Transistor 2SC313(E) (F)	1
7-TR2	ET517994	Transistor 2SC945(P)(Q)(R)(K)	1
7-TR3	ET453611	Transistor 2SC1096(L)(K) (Z Type)	1
7-TR4	ET539122	Transistor 2SA733(P)(Q)(R)	1
7-TR5	ET517994	Transistor 2SC945(P)(Q)(R)(K)	1
7-D1 to 8	ED224526	Silicon Diode 10D1	8
7-D9, 10	ED539976	Zener Diode WZ-130	2
7-D11 to 14	ED224526	Silicon Diode 10D1	4
7-2	AA545117	Heat-sink	1
7-3	ZS447772	Tapping Screw #2 3x6 (BR)	1
7-4	EJ539662	Wrapping Post 1x17	19
		Capacitor, Vertical Type	
7-C1	EC551160	Ceramic 0.01μF(Z) 1.4kWV	1
7-C2, 3	EC403468	Elect. 330μF 50WV	2
7-C4	EC321221	Elect. 100μF 50WV	1
7-C5	EC557627	Ceramic 0.01μF(Z) 50WV	1
7-C6	EC321221	Elect. 100μF 50WV	1
7-C7	EC331817	Elect. 470μF 25WV	1
7-C8	EC220127	Elect. 100μF 16WV	1
7-C9	EC557627	Ceramic 0.01μF(Z) 50WV	1
7-C10	EC321221	Elect. 100μF 50WV	1
7-C11	EC336115	Elect. 220μF 25WV	1
7-C12	EC321208	Elect. 220μF 16WV	1
		Resistor, Stopper Type	
7-R1	ER212883	Carbon RD1/4 4.7k(J)	1
7-R2	ER362441	Carbon RD1/4 1.8k(J)	1
7-R3	ER349828	Carbon RD1/4 20k(J)	1
7-R4	ER306887	Carbon RD1/4 15k(J)	1
7-R5	ER520852	Carbon RD1/4 4.7(J)	1
7-R6	ER343135	Carbon RD1/4 1.6k(J)	1
7-R7	ER520852	Carbon RD1/2 4.7(J)	1
7-R8	ER483390	Carbon RD1/2 330(J)	1
7-R9	ER458728	Carbon RD1/2 100(J)	1
7-R10	ER497417	Carbon RD1/2 560(J)	1
7-R11, 12	ER336442	Carbon RD1/4 10k(J)	2
7-R13	ER306887	Carbon RD1/4 15k(J)	1
7-R14, 15	ER212264	Carbon RD1/4 22k(J)	2
7-R16	ER346601	Carbon RD1/4 47k(J)	1

When ordering parts, please describe Parts Number, Serial Number, and Model Number in detail.

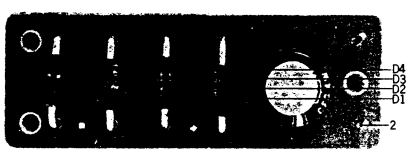
FIG. 8 PHOTO OF
RECTIFIER P.C. BOARD (1) (98-5010)



RECTIFIER P.C. BOARD (1) (98-5010) BLOCK

Symbol No.	Parts No.	Description	Q'ty
8-1x	BA560676	Rectifier P.C. Board(1) Comp. (98-5010)	1
8-D1 to 4	ED558033	Silicon Diode Hifi 400V 3A (Special)	4
8-2	EJ539662	Wrapping Post 1x17	4
8-C1 to 5	EC551160	Ceramic/C. 0.01μF(Z) 1.4kWV	5

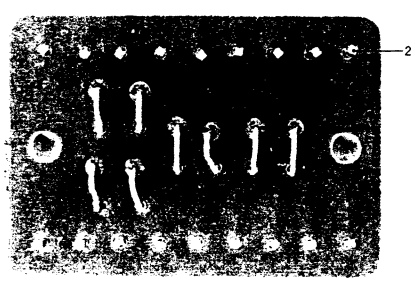
FIG. 9 PHOTO OF
RECTIFIER P.C. BOARD (2) (98-5011)



RECTIFIER P.C. BOARD (2) (98-5011) BLOCK

Symbol No.	Parts No.	Description	Q'ty
9-1x	BA560687	Rectifier P.C. Board (2) Comp.(98-5011)	1
9-D1 to 4	ED558033	Silicon Diode HiFi 400V 3A(Special)	4
9-2	EJ539662	Wrapping Post 1x17	4
9-C1	EC220410	Elect./C. 1000μF 10WV(Vert. Type)	1

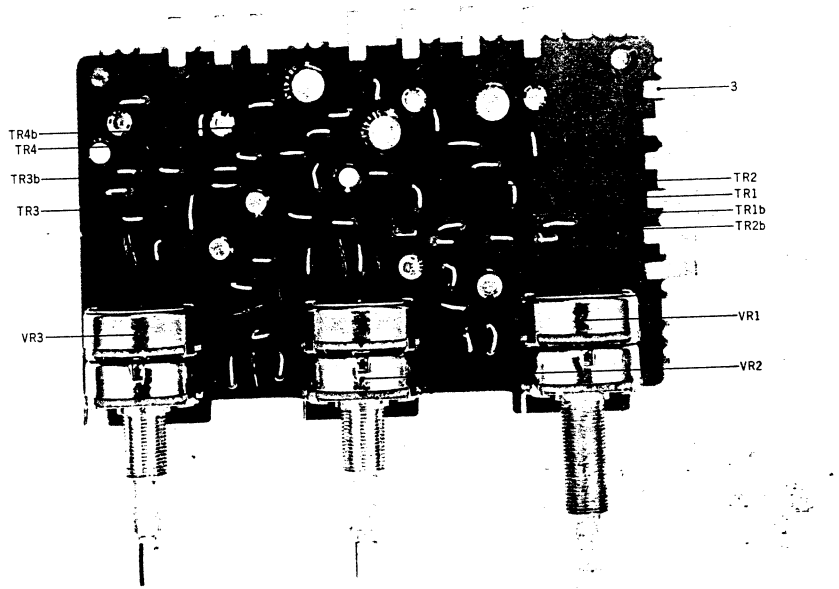
FIG. 10 PHOTO OF
RESISTOR P.C. BOARD (98-5060)



RESISTOR P.C. BOARD (98-5060) BLOCK

Symbol No.	Parts No.	Description	Q'ty
10-1x	BA560632	Resistor P.C. Board Comp. (98-5060)	1
10-2	EJ539662	Wrapping Post 1x17	18
		Resistor, Stopper Type	
10-R1	ER404087	Carbon RD1/4 160k(J)	1
10-R2	ER357535	Carbon RD1/4 39k(J)	1
10-R3	ER404087	Carbon RD1/4 160k(J)	1
10-R4	ER357535	Carbon RD1/4 39k(J)	1
10-R5to8	ER349907	Carbon RD1/4 33k(J)	4

FIG. 11 PHOTO OF TONE CONTROL P.C. BOARD (98-5007)

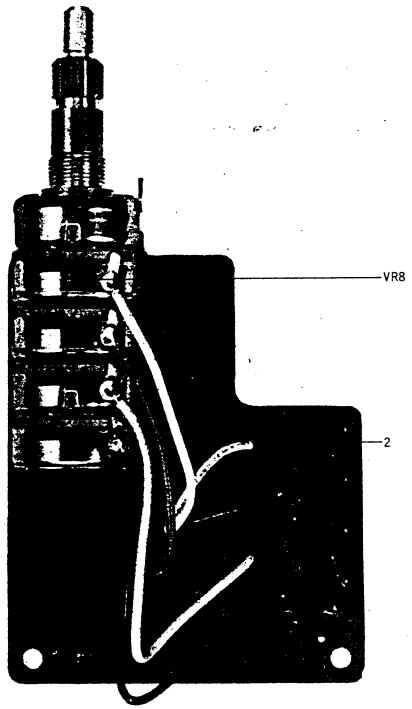


TONE CONTROL P.C. BOARD (98-5007) BLOCK

Symbol No.	Parts No.	Description	Q'ty
11-1x	BA560496	Tone Control P.C. Board Comp. (98-5007)	1
11-2x	BA560507	Tone Control P.C. Board Comp. (98-5007) (USB)	1
11-TR1 to 4	ET539987	Transistor 2SC1312(F) (G)	8
11-VR1	EV557921	Co-axial 2-throw Vol. (w/click) V24L5GPHN 1Z 250 kΩx2	1
11-VR2, 3	EV555941	Co-axial 20throw Vol. (w/click) V24L5GPHN 1kB 100kΩx2	2
11-3	EJ539673	Wrapping Terminal T5290	13
11-4x	EJ557932	Wrapping Terminal T5303	13
		Capacitor, Vertical Type	
11-C1	EC313108	Elect. 1μF 50WV	2
11-C2	EC346735	Elect. 47μF 50WV	2
11-C3	EC313108	Elect. 1μF 50WV	2
11-C4	EC379214	Mylar 0.047μF(J) 50WV	2
11-C5	EC424708	Mylar 0.0018μF(J) 50WV	2
11-C6	EC379214	Mylar 0.047μF(J) 50WV	2
11-C7, 8	EC220994	Elect. 10μF 25WV	4
11-C9	EC313108	Elect. 1μF 50WV	2
11-C10	EC346735	Elect. 47μF 50WV	1

Symbol No.	Parts No.	Description	Q'ty
		Resistor, Stopper Type	
11-R1	ER211465	Carbon RD1/4 1k(J)	2
11-R2	ER211757	Carbon RD1/4 100k(J)	2
11-R3	ER336442	Carbon RD1/4 10k(J)	2
11-R4	ER430042	Carbon RD1/4 2.4k(J)	2
11-R5	ER352045	Carbon RD1/4 3.9k(J)	2
11-R6	ER213465	Carbon RD1/4 820(J)	2
11-R7	ER336442	Carbon RD1/4 10k(J)	2
11-R8	ER324202	Carbon RD1/4 5.1k(J)	2
11-R9	ER211757	Carbon RD1/4 100k(J)	2
11-R10	ER336442	Carbon RD1/4 10k(J)	2
11-R11	ER212883	Carbon RD1/4 4.7k(J)	2
11-R12	ER211757	Carbon RD1/4 100k(J)	2
11-R13	ER336442	Carbon RD1/4 10k(J)	2
11-R14	ER211667	Carbon RD1/4 100(J)	2
11-R15	ER211465	Carbon RD1/4 1k(J)	2
11-R16	ER211757	Carbon RD1/4 100k(J)	2
11-R17	ER357535	Carbon RD1/4 39k(J)	2
11-R18	ER361620	Carbon RD1/4 300(J)	2
11-R19	ER380755	Carbon RD1/4 6.2k(J)	2
11-R20	ER406912	Carbon RD1/4 240(J)	2
11-R21	ER211465	Carbon RD1/4 1k(J)	2
11-R22	ER211667	Carbon RD1/4 100(J)	1

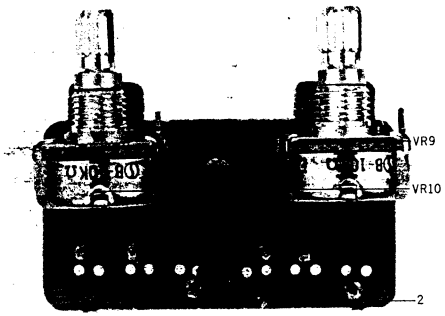
FIG. 12 PHOTO OF VOL. P.C. BOARD (98-5006)



VOL. P.C. BOARD (98-5006) BLOCK

Symbol No.	Parts No.	Description	Q'ty
12-1x	BA560474	Vol. P.C. Board Comp. (98-5006)	1
12-VRS	EV557842	Co-axial 4-Throw Vol. (w/pre-set) V24L5DPHN 2BL 250 kΩx4	1
12-2	EJ539662	Wrapping Post 1x17	16

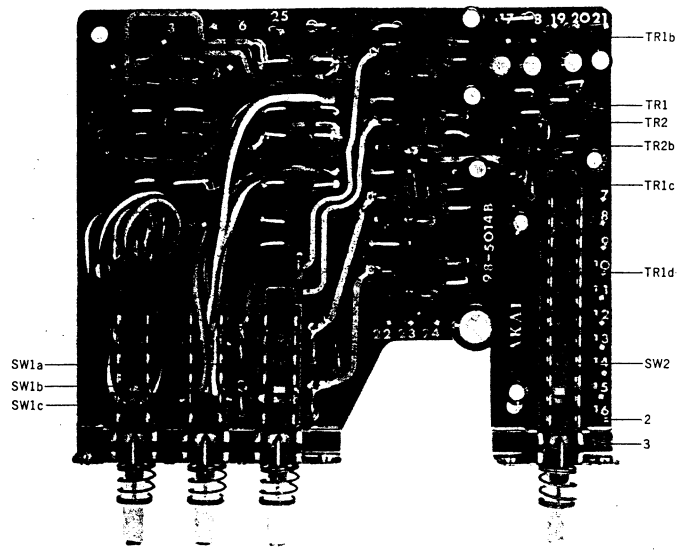
FIG. 13 PHOTO OF SEP P.C. BOARD (98-5005)



SEP P.C. BOARD (98-5005) BLOCK

Symbol No.	Parts No.	Description	Q'ty
13-1x	BA560463	SEP P.C. Board Comp. (98-5005)	1
13-VR9, 10	EV557831	Vol. V16L4PHN 410 kΩ	2
13-2	EJ539662	Wrapping Post 1x17	6

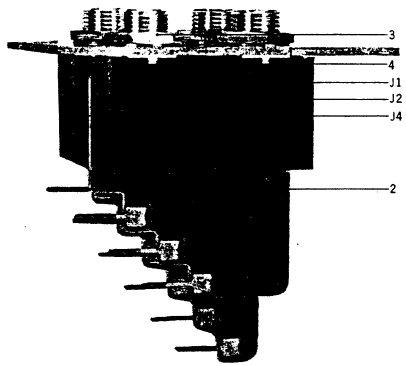
FIG. 14 PHOTO OF REMOTE P.C. BOARD (98-5014)



REMOTE P.C. BOARD (98-5014) BLOCK

Symbol No.	Parts No.	Description	Q'ty
14-1x	BA560485	Remote P.C. Board Comp. (98-5014)	1
14-TR1, 2	ET539987	Transistor 2SC1312(F) (G)	6
14-SW1	ES591118	Push SW. 3FT-0001 DF-1320	1
14-SW2	ES591107	Push SW. 1FT-0001 AF-1320	1
14-J5x	EJ557910	Socket CS289	1
14-2	EJ539662	Wrapping Post 1x17	25
14-3	AZ544803	Push SW. Mt. Plate	1
14-4x	ZS371856	ISO Screw, binding head 3x5	6
14-5x	AZ544814	Din Jack Mt. Plate	1
		Capacitor, Vertical Type	
14-C1	EC368357	Mylar 0.056μF(J) 50WV	4
14-C2	EC411827	Mylar 0.0082μF(J) 50WV	4
14-C3	EC522516	Tantalum 1μF(M) 25WV (Dts Type)	4
14-C4	EC377212	VFM 47PF(J) 50WV	4
14-C5	EC313108	Elect. 1μF 50WV	4
14-C6	EC346735	Elect. 47μF 50WV	1
14-C7	EC313108	Elect. 1μF 50WV	2
14-C8	EC487394	VFM 47PF(K) 50WV	2
14-C9, 10	EC313108	Elect. 1μF 50WV	4
14-C11	EC220612	Elect. 33μF 25WV	1
		Resistor, Stopper Type	
14-R1	ER211757	Carbon RD1/4 100k(J)	4
14-R2	ER350100	Carbon RD1/4 68k(J)	4
14-R3	ER346544	Carbon RD1/4 3k(J)	4
14-R4	ER429996	Carbon RD1/4 470k(J)	4
14-R5	ER211757	Carbon RD1/4 100k(J)	4
14-R6	ER211858	Carbon RD1/4 12k(J)	4
14-R7	ER211465	Carbon RD1/4 1k(J)	4
14-R8	ER380711	Carbon RD1/4 220k(J)	4
14-R9	ER211757	Carbon RD1/4 100k(J)	4
14-R10	ER304290	Carbon RD1/4 10(J)	4
14-R11	ER336442	Carbon RD1/4 10k(J)	4
14-R12	ER380711	Carbon RD1/4 220k(J)	2
14-R13	ER211757	Carbon RD1/4 100k(J)	2
14-R14, 15	ER336442	Carbon RD1/4 10k(J)	4
14-R16	ER211465	Carbon RD1/4 1k(J)	1
14-R17	ER211320	Carbon RD1/4 1.5k(J)	1

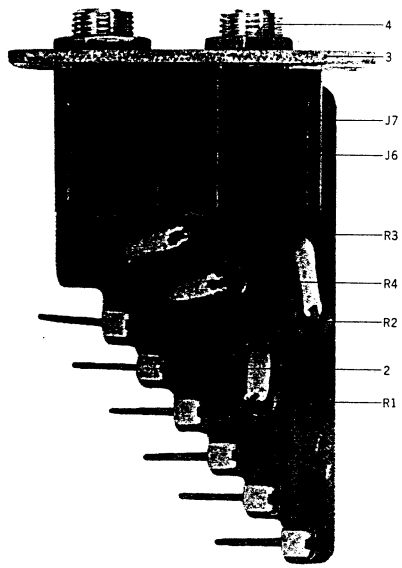
FIG. 15 PHOTO OF MIC, DUB P.C. BOARD (98-5059, 5013)



MIC, DUB P.C. BOARD (98-5059, 5013) BLOCK

Symbol No.	Parts No.	Description	Q'ty
15-1x	BA560520	Mic, Dub P.C. Board Comp. (95-5059, 5013)	1
15-J1, 2	EJ391094	Mic. Jack 2PMJ1P	2
15-J3, 4	EJ391083	Mic. Jack 3PMJ1P	2
15-2	EJ550012	Wrapping Terminal T5280	9
15-3	ZW270191	E Jack Nut	4
15-4	AZ545106	Jack Mt. Plate	1

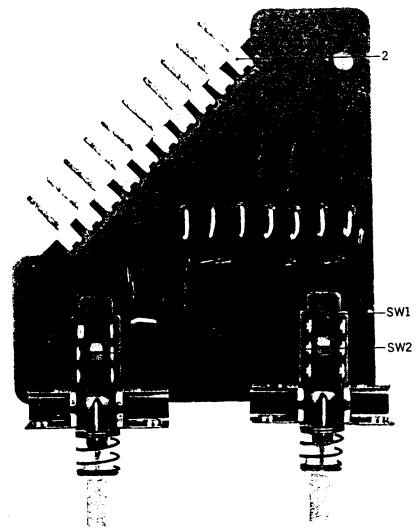
FIG. 16 PHOTO OF HP P.C. BOARD (98-5012)



HP P.C. BOARD (98-5012) BLOCK

Symbol No.	Parts No.	Description	Q'ty
16-1x	BA560531	HP P.C. Board Comp. (98-5012)	1
16-J6, 7	EJ437321	Jack, 3P Molded 3PMJ1P	2
16-2	EJ550012	Wrapping Terminal T5280	6
16-3	AZ544836	Hone Jack Mt. Plate	1
16-4	ZW270191	E Jack Nut	2
16-R1 to 4	ER559034	Metal Oxide Film/R. 2W 330Ω(K)	4

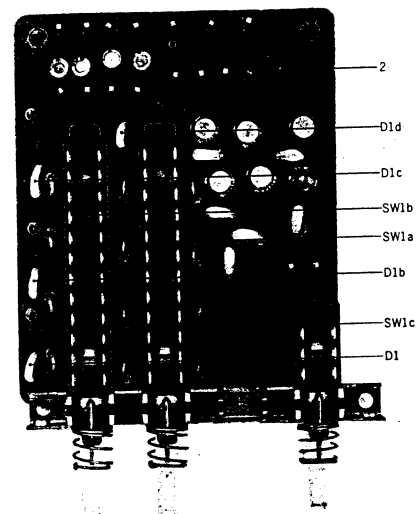
FIG. 17 PHOTO OF LOUDNESS P.C. BOARD (98-5016)



LOUDNESS P.C. BOARD (98-5016) BLOCK

Symbol No.	Parts No.	Description	Q'ty
17-1x	BA560518	Loudness P.C. Board Comp. (98-5016)	1
17-SW1, 2	ES551171	Push SW. 1FS-2U-12	2
17-2	EJ550012	Wrapping Terminal T5280	10
		Capacitor, Vertical Type	
17-C1	EC368335	Mylar 0.022μF(J) 50WV	2
17-C2	EC389237	VFM 200PF(J) 50WV	2
17-C3,4	EC368335	Mylar 0.022μF(J) 50WV	4
		Resistor, Stopper Type	
17-R1	ER346994	Carbon RD1/4 18k(J)	2
17-R2	ER357570	Carbon RD1/4 150k(J)	2
17-R3	ER346994	Carbon RD1/4 18k(J)	2
17-R4	ER357570	Carbon RD1/4 150k(J)	2

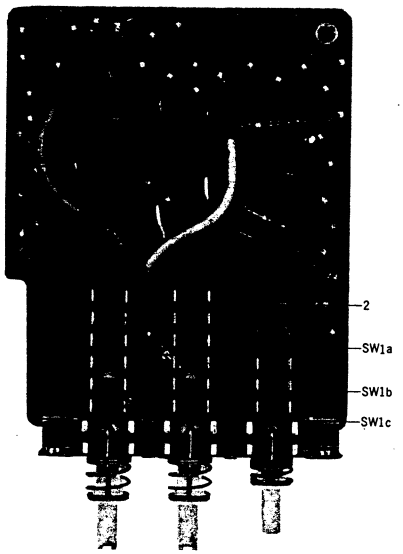
FIG. 18 PHOTO OF METER P.C. BOARD (98-5003)



METER P.C. BOARD (98-5003) BLOCK

Symbol No.	Parts No.	Description	Q'ty
18-1x	BA560441	Meter P.C. Board Comp. (98-5003)	1
18-D1	ED219464	Germanium Diode 1N34A	4
18-SW1	ES557785	Push Switch 3FS-18U-461-1	1
18-2	EJ539662	Wrapping Post 1x17	17
		Capacitor, Vertical Type	
18-C1	EC523282	Solid Aluminum 0.1μF(M) 25WV	4
18-C2	EC220994	Elect. 10μF 25WV	6
		Resistor, Stopper Type	
18-R1	ER349828	Carbon RD1/4 20k(J)	4
18-R2	ER357535	Carbon RD1/4 39k(J)	4
18-R3	ER212883	Carbon RD1/4 4.7k(J)	4
18-R4	ER213467	Carbon RD1/4 820(J)	4
18-R5	ER557796	Carbon RD1/2 470(K)	6

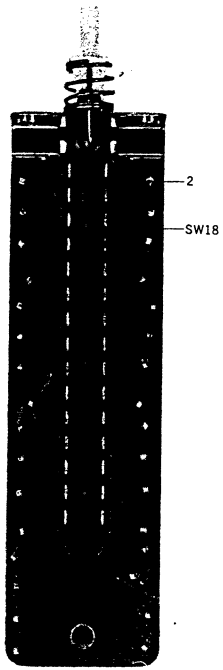
FIG. 19 PHOTO OF TAPE P.C. BOARD (98-5002)



TAPE P.C. BOARD (98-5002) BLOCK

Symbol No.	Parts No.	Description	Q'ty
19-1x	BA560430	Tape P.C. Board Comp. (98-5002)	1
19-SW1	ES557774	Push Switch 3FS-10U-461	1
19-2	EJ539662	Wrapping Post 1x17	37
19-C1to10	EC557616	Ceramic/C. 390PF(K) 50WV	10
		Resistor, Stopper Type	
19-R1	ER371946	Carbon RD1/4 2k(J)	1
19-R2	ER392534	Carbon RD1/4 2k(J)	1
19-R3	ER371946	Carbon RD1/4 2k(J)	1
19-R4	ER392534	Carbon RD1/4 2k(J)	1
19-R5to10	ER371946	Carbon RD1/4 2k(J)	1
19-R11,12	ER336442	Carbon RD1/4 10k(J)	1

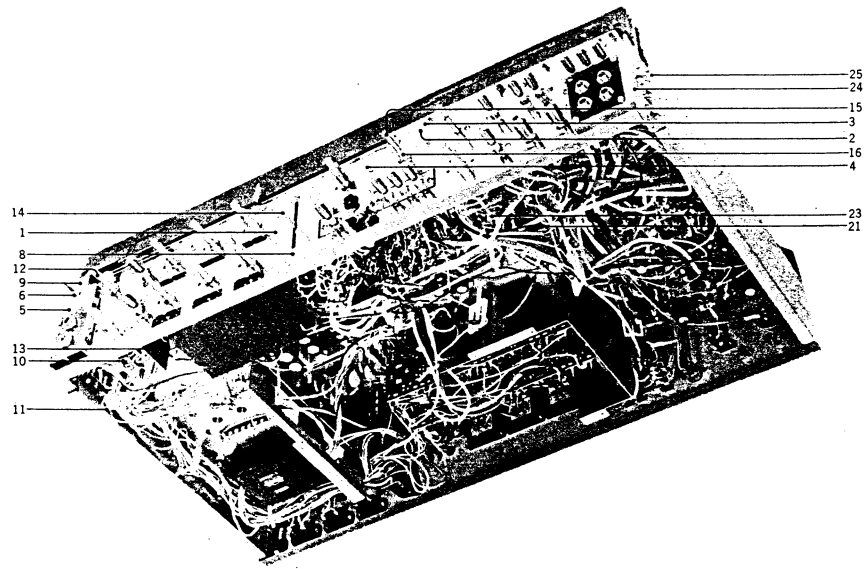
FIG. 20 PHOTO OF CD-4 CHANGING P.C. BOARD (98-5004)



CD-4 CHANGING P.C. BOARD (98-5004) BLOCK

Symbol No.	Parts No.	Description	Q'ty
20-1x	BA560452	CD-4 Changing P.C. Board Comp. (98-5004)	1
20-SW18	ES591120	Push Switch 1FT-0002 AF-1320	1
20-2	EJ539662	Wrapping Post 1x17	32

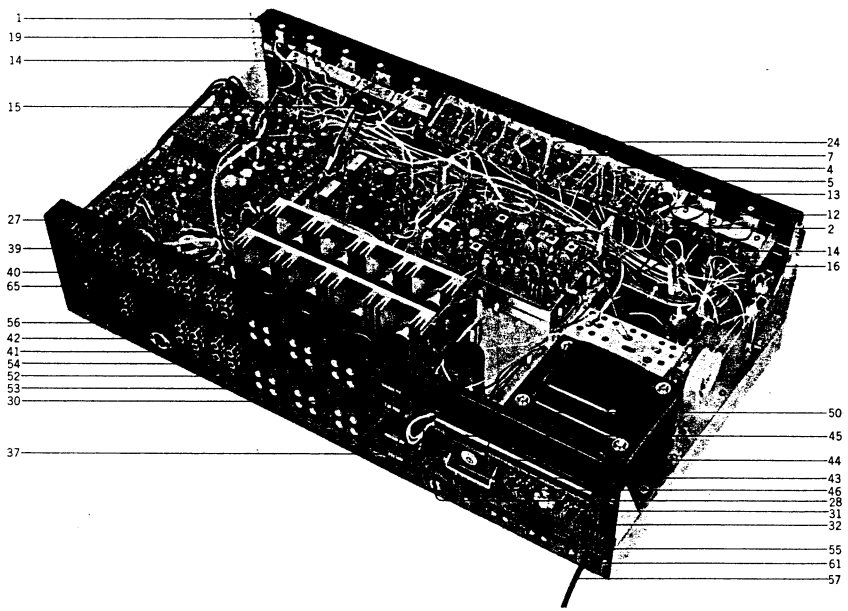
FIG. 21 PHOTO OF FRONT SHASSIS BLOCK

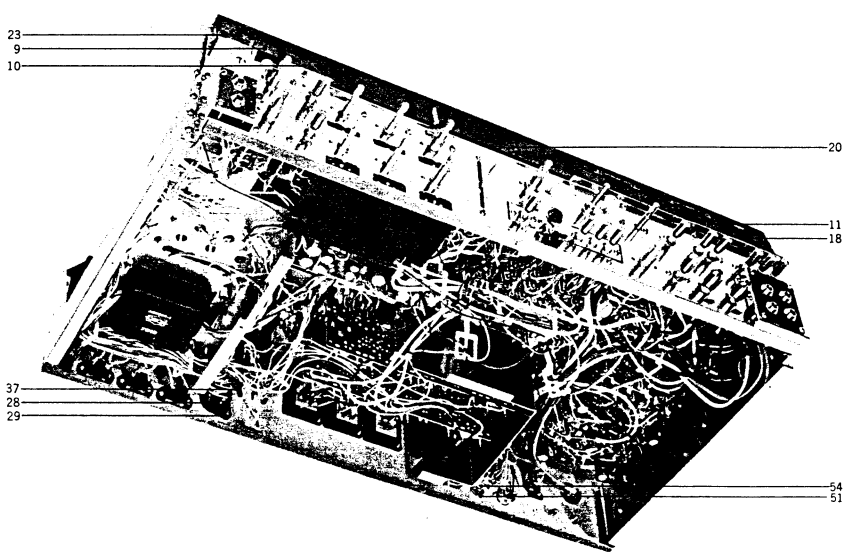


FRONT SHASSIS BLOCK

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
21-1	AZ545207	Front Chassis	98-5031	1
21-2	ZS530684	Roller Screw B (L=13)	91-5010	3
21-3	MR530662	Roller B (D=10)	91-5009	3
21-4	MR530651	Roller A (D=14)	91-5008	1
21-5	AZ544825	Power SW. Retaining Angle	98-5036	1
21-6	ES468448	Lever SW. SDD4LFJO (LPS60122FJOO)	25-4-12	1
21-7x	EC551160	Ceramic/C. 0.01μF(Z) 1.4kWV	24-5-55	2
21-8	ZS371856	ISO Screw, binding head 3x5		8
21-9	ZS447772	Tapping Screw #2 3x6(BR)		4
21-10	ES560283	Rotary SW. SR32N-4-12-6	25-7-35	1
21-11	MZ229138	Wire Bundle Holder N-108	2-35-1	13
21-12	ES560294	Rotary SW. SR32N-3-8-2	25-7-33	1
21-13	AZ544858	Shield Plate B	98-5029	1
21-14	EV557741	4-throw Slide/Vol (Center-click) VJ458G4RN-1Z 250kx4	36-34-1	1
21-15	MS530752	Tuning Shaft	91-5018	1
21-16	AA530741	Tuning Metal	91-5017	1
21-17x	ZW260122	Washer D6.1x10x1t (Nylon).		2
21-18x	BF530763	Flywheel	91-5019	1
21-19x	ZS462936	ISO Set Screw, hexagon socket 3x5 (cup/p.)		1
21-20x	AZ544847	Rotary SW. Mt. Plate	98-5038	1
21-21	ES557752	Rotary SW. Y8-18-6	25-7-38	1
21-22x	ER427961	Carbon/R. RD1/4 43k(J) (Insu. type)	35-9-5	2
21-23	ES557763	Rotary SW. SR26N 5-15-5 35KH	25-6-63	1
21-24	AZ545095	Jack Mt. Plate Angle	98-5032	1
21-25	ZS447772	Tapping Screw #2 3x6 (BR)		4

FIG. 22 PHOTO OF SCALE PLATE/REAR PANEL BLOCK



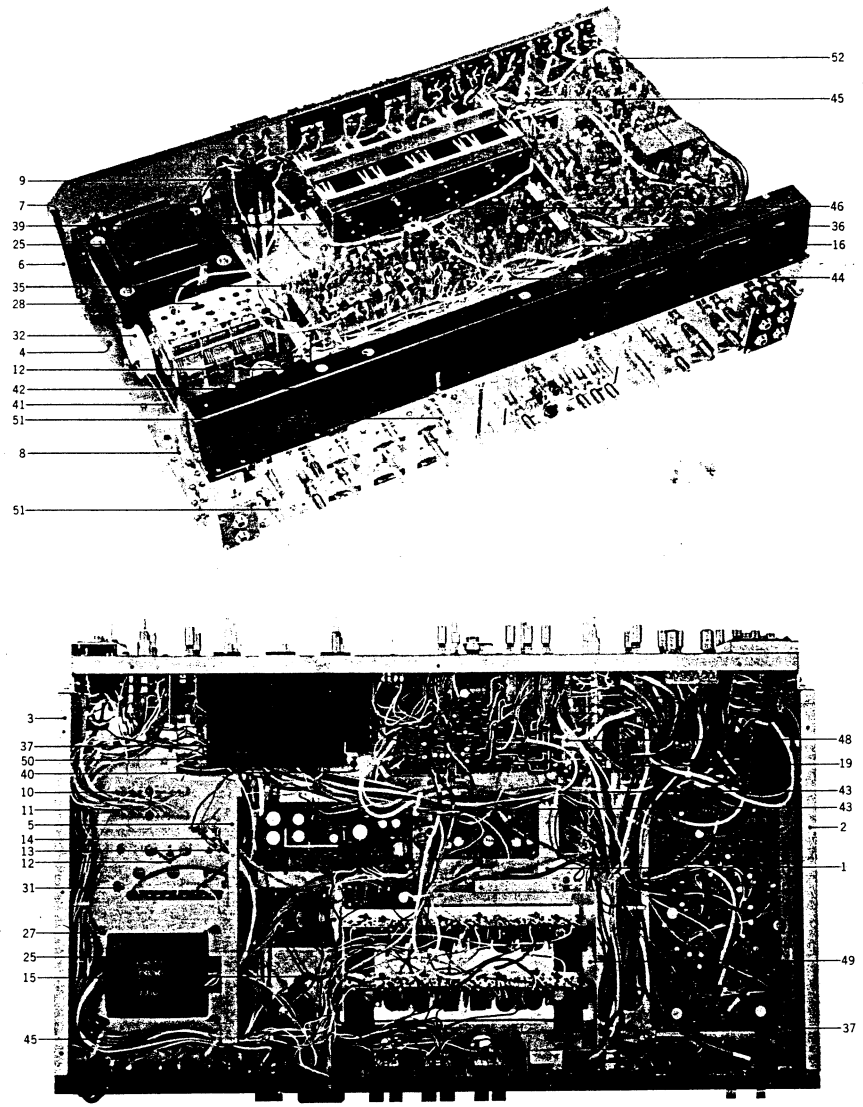


SCALE PLATE/REAR PANEL BLOCK

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
		SCALE MT. CHASSIS BLOCK		
22-1	AZ545218	Scale Mt. Chassis	98-5040	1
22-2	AZ544893	Lamp Case	98-5042	1
22-3x	ZS447772	Tapping Screw #2 3x6 (BR)		10
22-4	AA544904	Lamp Holder, w/prop	98-5043	1
22-5	AA544915	Lamp Holder Case	98-5044	1
22-6x	ZW465287	Tapping Screw #2 3x15 round		2
22-7	EL550045	Cord Lamp #3 8V 50 mA	28-2-30	12
22-8x	SM531336	Illumination Plate, Pointer	91-5965	1
22-9	EM551248	Signal Meter KL-218L-25	46-1-71	1
22-10	EM551250	Tuning Meter KL-218L-27	46-1-70	1
22-11	EM539706	Level Meter KL-218L-28	46-1-69	4
22-12	AA533384	Meter Mt. Angle	94-5030	3
22-13	ZS371856	ISO Screw, binding head 3x5		7
22-14	AA530820	Meter Case	91-5025	6
22-15	ZS447772	Tapping Screw #2 3x6 (BR)		12
22-16	EJ367986	Puse Holder 1P AC125V 5A	40-1-8	6
22-17x	EL539684	Fuse Type Lamp 8V 0.3A	28-2-27	11
22-18	EM558044	Indicator (2-4ch)	28-2-31	1
22-19	AA544926	Indicator Support	98-5045	1
22-20	AA544871	Scale Plate B	98-5041	1
22-21x	AA544860	Scale Plate A (J)	98-5041	1
22-22x	AA544882	Scale Plate C (A)	98-5041	1
22-23	EJ556143	Canoe Clip (Large)	2-7-35	2
		LAMP P.C. BOARD BLOCK		
22-24	BA560575	Lamp P.C. Board Comp. (98-5001)		1
22-25x	EJ539662	Wrapping Post 1x17	32-1-48	19
22-26x	EJ514822	Fuse Holder, P.C. Board S-N5051	40-1-28	10
		REAR PANEL BLOCK		
22-27	SP544948	Rear Panel A	98-5047	1
22-28	EJ233370	Socket (Volt. Selector) S-18010	40-2-3	1
22-29	ZW552611	ISO Screw, pan head 3x8		2
22-30	ZS570385	ISO Screw, tap-tight 3x8 (pan)		30
22-31	AA510625	5P Antenna Terminal Plate	32-1-29	1
22-32	ZS552611	ISO Screw, pan head 3x8		4
22-33x	ZW348107	ISO NUT M3		5
22-34x	BT444137	Balum Trans. 75Ω-300Ω	23-1-129	1
22-35x	ZW273778	Earth Lug M3		1
22-36x	ZW273802	Toothed Lock Washer M3		3
22-37	EJ539796	Fuse Hodler 2P	40-1-29	2
22-38x	ZS447772	Tapping Screw #2 3x6 (BR)		4
22-39	EJ557875	Wrapping Pin Jack 2P	31-1-110	4
22-40	EJ539763	Wrapping Pin Jack B 4P T5346-B	31-1-106	5
22-41	EJ299305	Jack, 5P Din	31-1-1	1
22-42	ZS447761	Tapping Screw #2 3x6 (BR) (Black)		4
22-43	AA530910	Antenna Channel	91-5029	1
22-44	AA557886	Bar Antenna	55-1-16	1
22-45	AA378268	Antenna Support	AA-5552	1
22-46	ZS379451	ISO Screw, round head 4x50		1
22-47x	ZW273914	Spring Washer M4		2
22-48x	ZW348030	ISO NUT M4		1
22-49x	ZW551373	Washer D4.2x8x0.5t		2
22-50	EZ382263	Strain Relief SR-4K-4	2-7-12	1
22-51	AZ544950	Vol. Mt. Parts	98-5049	2
22-52	EV557897	Vol. V16L4N B1K	36-6-2	1
22-53	ZS552622	ISO Screw, pan head 3x6		4
22-54	EV557943	Co-axial 20throw, Vol.	36-22-13	1
22-55	EJ378944	Socket, AC U/L S-1 9122	31-1-47	3
22-56	EZ486257	Metal Terminal	32-1-27	2
22-57	EW540112	AC Cord (UL) 2.5M	26-3-19	1
22-58x	EW524845	AC Cord (J) 2.5M	26-3-31	1
22-59x	EW315448	Australia Cord (3 core)	26-3-11	1
22-60x	EW486797	Power Supply Cord (VDE) (WG)	26-3-26	1
22-61	EZ382263	Strain Relief SR-4K-4	2-7-12	1
22-62x	EZ246936	Strain Relief SR-6W-1 (WG, 3 core)	2-7-8	1
22-63x	ER428567	Solid/R. RC1/2 2.2M(K)	35-5-4	1
22-64x	ER430211	Carbon/R. RD1/4 3.9k(J) (Insu. type)	35-9-5	2
22-65	EJ354936	1P Pin-Jack	31-1-32	1

When ordering parts, please describe Parts Number, Serial Number, and Model Number in detail.

FIG. 23 PHOTO OF ASSEMBLY BLOCK

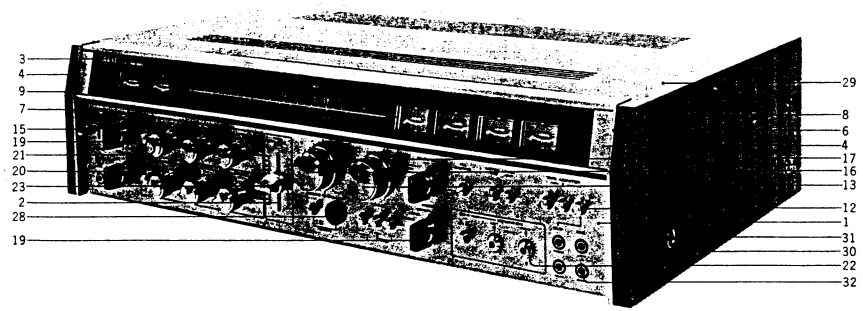


ASSEMBLY BLOCK

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
23-1	AZ545185	Main Chassis, w/sub chassis	98-5018	1
23-2	AZ545253	Side Plate (Right)	98-5027	1
23-3	AZ545264	Side Plate (Left)	98-5028	1
23-4	ZS447772	Tapping Screw #2 3x6 (BR)		43
23-5	AZ545242	Supporting Plate	98-5026	1
23-6	AZ545130	Supporting Plate A	98-5029	1
23-7	ZS447840	Tapping Screw #2 3x8 (BR)		2
23-8	AZ545152	Roller Base	98-5030	1
23-9	EC557695	Elect./C. 3300μF 80WV (Lug type)	24-10-79	1
23-10	EJ550067	Lug Plate 4P T5305	33-5-5	2
23-11	ZS447805	Tapping Screw #2 3x12 (BR)		2
23-12	EJ539447	Earth Terminal 2P T4460	32-1-32	3
23-13	EJ255025	Lug Plate KP2L1	33-3-4	1
23-14	ER562566	Cement/R. 2W 0.47Ω(K) (wire-wound type)	35-16-1	1
23-15	EJ551035	Wrapping Terminal 4P T5251	32-1-36	4
23-16	AZ545128	P.C. Board Retaining Base	98-5019	1
23-17x	AZ545174	P.C. Board Support A	98-5023	1
23-18x	EJ254970	Lug Plate KP1L1	33-3-3	1
23-19	AZ545196	P.C. Board Support B	98-5024	2
23-20x	AZ545220	P.C. Board Support C (Vol.)	98-5025	1
23-21x	MR530662	Roller B (D=10)	91-5009	2
23-22x	ZS530673	Roller Screw A (L=9)	91-5010	2
23-23x	AZ545038	Roller Angle	98-5057	1
23-24x	ZS371856	ISO Screw, binding head 3x5		4
23-25	BT557684	Power Trans. AA-980T-1	38-4-233	1
23-26x	ZW274026	Spring Washer M5		4
23-27	ZW463410	ISO Nut M5 #3		4
23-28	AF550978	Front End FL414U14	57-2-25	1
23-29x	AF444194	FM Front End FL412J19 (J)	57-2-8	1
23-30x	AF448345	FM Front End FL412S13 (A)	57-2-11	1
23-31	ZS321298	ISO Screw, binding head 3x8		4
23-32	MR530706	Pulley	91-5012	1
23-33x	ZS321298	ISO Screw, binding head 3x8		1
23-34x	ZG549011	Tuning Spring	91-5094	1
23-35	AA530627	IF P.C. Board Retaining Plate	91-5005	2
23-36	EJ539447	Earth Terminal 2P T4460	32-1-32	1
23-37	EJ556143	Canoe Clop (Large)	2-7-35	10
23-38x	EJ524700	Canoe Clip	2-7-21	1
23-39	AZ545163	Heat-sink Retaining Plate	98-5021	2
23-40	MZ544937	Tone P.C. Board Support	98-5046	1
23-41	AA207347	Thread		1
23-42	AA530954	Dial Pointer	91-5039	1
23-43	EJ557717	Wire Clip 0017	2-7-26	6
23-44	EJ551057	Wire Clip 220-JD481010-0021	2-7-27	6
23-45	EJ510333	Wire Clip 220-JD481610-0104 (Nylon)	2-7-17	6
23-46	EJ496686	Wire Clip 220-JD486010-119	2-7-16	1
23-47x	EJ514607	Wire Clip 220-JD486210-01 (Nylon)	2-7-18	2
23-48	MZ229138	Wire Bundle Holder N-108	2-35-1	18
23-49	AZ545231	Shield Plate A	98-5022	1
23-50	AZ545040	Tone Insulator Plate	98-5058	1
23-51	AA531371	Stop Collar 2	91-5074	3
23-52	EJ514034	PC Support	2-7-20	32

When ordering parts, please describe Parts Number, Serial Number, and Model Number in detail.

FIG. 24 PHOTO OF FINAL ASSEMBLY BLOCK



FINAL ASSEMBLY BLOCK

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
		FRONT PANEL BLOCK		
24-1	SP545084	Front Panel	98-5052	1
24-2	SE546208	Slide Mask	98-5069	1
24-3	AA531123	Front Plate 9	91-5044	1
24-4	AA531145	Fitting 2	91-5045	2
24-5x	AA530976	Retaining Plate Cushion	91-5043	2
24-6	AA531156	Side Fitting A (Right)	91-5046	1
24-7	AA531167	Side Fitting B (Left)	91-5046	1
24-8	AA541517	Side Molding A (Right)	91-5082	1
24-9	AA541528	Side Molding B (Left)	91-5082	1
24-10x	ZS447840	Tapping Screw #2 3x8 (BR)		2
24-11x	ZS447805	Tapping Screw #2 3x12 (BR)		6
24-12	AA545905	Push Button Bush	98-5061	13
		ASSEMBLY BLOCK		
24-13	SK531213	Tuning Knob	91-5050	1
24-14x	ZS444240	Set Screw, hexagon socket 4x8 (cup/p.)		2
24-15	SK531314	Power Knob	91-5060	1
24-16	SK531358	Volume Knob	91-5073	1
24-17	SK531347	Volume Knob Ring	91-5071	1
24-18x	ZW493312	Washer D6.2x10x1t		1
24-19	SK547964	Selector Knob	98-5080	4
24-20	SK546658	Push Button Knob	98-5070	13
24-21	SK531281	Single Knob	91-5057	6
24-22	SK545016	Separation Knob	98-5054	2
24-23	SK545027	Slide Knob	98-5055	1
24-24x	SP544961	Bottom Plate	98-5050	1
24-25x	SA545005	Amp. Foot	98-5051	4
24-26x	ZW560272	Tapping Screw #2 4x15 Truss		4
24-27x	ZS447772	Tapping Screw #2 3x6 (BR)		13
24-28	AA545894	Remote Jack Cover	98-5062	1
24-29	BC545073	Cabinet	98-5056	1
24-30	ZW548010	Spot Facing Washer	MU-6028	4
24-31	ZW552824	ISO Screw, binding head 4x18		4
24-32	EZ436217	Collar for Jack	MC-5006	6
24-33x	EF563657	Fuse 3A 250V	39-1-50	1
24-34x	EF575234	Fuse 6A 250V	39-1-50	1
24-35x	EF562691	Fuse 2.5A 250V	39-1-50	4
24-36x	AA539537	Fuse Holder Cover 2P	2-34-78	2
24-37x	ZS552622	ISO Screw, pan head 3x6		2
24-38x	EJ552778	Short Pin Plug PO107	42-1-65	4

When ordering parts, please describe Parts Number, Serial Number, and Model Number in detail.

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EO551428	1-T4	ER212681	1-R2	ER306887	4-R79	ER345756	3-R355,56	ER357570	4-R111
EO716984	3-L301,2	ER212681	1-R5	ER306887	5-R19	ER346544	4-R9	ER357570	4-R122,23
ER211320	4-R23	ER212681	1-R11,12	ER306887	6-R5	ER346544	4-R35	ER357570	4-R150
ER211320	4-R58	ER212681	1-R14	ER306887	7-R4	ER346544	4-R69	ER357570	4-R154
ER211320	4-R89	ER212681	1-R34	ER306887	7-R13	ER346544	4-R97	ER357570	4-R170
ER211320	4-R115	ER212681	2-R24	ER315213	3-R119,20	ER346544	5-R6	ER357570	4-R174
ER211320	4-R142	ER212872	1-R4	ER315213	3-R243,44	ER346544	14-R3	ER357570	17-R2
ER211320	4-R162	ER212883	1-R7	ER315213	3-R264	ER346601	2-R12,13	ER357570	17-R4
ER211320	14-R17	ER212883	1-R42	ER315213	3-R317,18	ER346601	2-R27,28	ER361528	4-R143
ER211465	1-R6	ER212883	2-R20,21	ER315213	3-R333,34	ER346601	4-R17	ER361528	4-R163
ER211465	1-R21,22	ER212883	2-R25,26	ER315213	3-R345,46	ER346601	4-R38	ER361528	6-R2
ER211465	1-R38	ER212883	4-R4,5	ER324202	11-R8	ER346601	4-R48	ER361620	11-R18
ER211465	1-R46	ER212883	4-R20	ER324641	3-R103,4	ER346601	4-R52	ER362272	6-R6
ER211465	1-R50,51	ER212883	4-R30,31	ER324641	3-R121,22	ER346601	4-R83	ER362441	7-R2
ER211465	1-R56,57	ER212883	4-R64,65	ER324641	3-R143to46	ER346601	4-R105	ER364948	3-R251,52
ER211465	2-R8	ER212883	4-R86	ER324685	3-R127,28	ER346601	4-R109	ER364948	3-R319,20
ER211465	2-R14,15	ER212883	4-R92,93	ER324685	3-R225,26	ER346601	4-R118	ER364950	3-R256
ER211465	6-R1	ER212883	4-R112	ER324685	3-R261,62	ER346601	4-R121	ER364950	3-R321,22
ER211465	6-R4	ER212883	5-R9	ER324685	3-R269	ER346601	6-R14	ER364983	3-R239,40
ER211465	6-R17	ER212883	7-R1	ER324685	3-R357,58	ER346601	7-R16	ER364983	3-R327,28
ER211465	11-R1	ER212883	11-R11	ER324720	3-R268	ER346994	2-R1	ER364994	3-R349,50
ER211465	11-R15	ER212883	18-R3	ER324720	3-R313,14	ER346994	4-R11	ER365016	3-R107,8
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ER211465	14-R7	ER213030	4-R53	ER324808	3-R266	ER346994	6-R13	ER365016	3-R271
ER211465	14-R16	ER213030	4-R84	ER324808	3-R335,36	ER346994	17-R1	ER368223	3-R301,2
ER211667	1-R1	ER213030	4-R110	ER329264	5-R2	ER346994	17-R3	ER368223	3-R347,48
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ER211667	4-R136	ER213647	3-R233,34	ER336442	2-R7	ER349907	4-R13	ER380711	4-R40
ER211667	11-R14	ER213715	3-R109,10	ER336442	4-R25	ER349907	4-R72	ER380711	4-R74
ER211667	11-R22	ER213715	3-R123,24	ER336442	4-R26	ER349907	6-R7	ER380711	4-R148
ER211757	1-R26	ER213715	3-R241,42	ER336442	4-R42,43	ER349907	10-R5to8	ER380711	4-R168
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ER211757	4-R22	ER213715	3-R341,42	ER336442	4-R60	ER350065	4-R55	ER380711	14-R12
ER211757	4-R41	ER213715	3-R359to62	ER336442	4-R76,77	ER350065	4-R87	ER380755	4-R46
ER211757	4-R47	ER213715	5-R1	ER336442	4-R108	ER350065	4-R113	ER380755	4-R81
ER211757	4-R49	ER213794	3-R105,6	ER336442	4-R140	ER350100	14-R2	ER380755	11-R19
ER211757	4-R57	ER213794	3-R253	ER336442	4-R146	ER352045	4-R124	ER380913	1-R18
ER211757	4-R75	ER213873	3-R133,34	ER336442	4-R160	ER352045	4-R127	ER392534	19-R2
ER211757	4-R88	ER213873	3-R339,40	ER336442	4-R166	ER352045	4-R151	ER392534	19-R4
ER211757	4-R104	ER214290	3-R117,18	ER336442	6-R16	ER352045	4-R171	ER392850	1-R30
ER211757	4-R106	ER214290	3-R207,8	ER336442	7-R11,12	ER352045	11-R5	ER392850	4-R149
ER211757	4-R114	ER214290	3-R231,32	ER336442	11-R3	ER357456	1-R37	ER392850	4-R169
ER211757	4-R128,29	ER214290	3-R258	ER336442	11-R7	ER357456	1-R45	ER395460	4-R130,31
ER211757	4-R137,38	ER214290	3-R307to10	ER336442	11-R10	ER357456	1-R62	ER399060	1-R19
ER211757	4-R156,57,58	ER214290	3-R351,52	ER336442	11-R13	ER357456	2-R11	ER404087	10-R1
ER211757	4-R176	ER214536	3-R131,32	ER336442	14-R11	ER357456	4-R7,8	ER404087	10-R3
ER211757	5-R4	ER214536	3-R235,36	ER336442	14-R14,15	ER357456	4-R33,34	ER406034	3-R229,30
ER211757	11-R2	ER214536	3-R325,26	ER336442	19-R11,12	ER357456	4-R67,68	ER406912	11-R20
ER211757	11-R9	ER229555	3-R156	ER339131	3-R152	ER357456	4-R95,96	ER407316	1-R55
ER211757	11-R12	ER229757	3-R365	ER342933	1-R41	ER357456	4-R155	ER407316	4-R10
ER211757	11-R16	ER230038	3-R367	ER342933	4-R14	ER357456	4-R175	ER407316	4-R24
ER211757	14-R1	ER304290	1-R13	ER342933	4-R44,45	ER357456	6-R8	ER407316	4-R36
ER211757	14-R5	ER304290	1-R16,17	ER342933	4-R80	ER357456	6-R12	ER407316	4-R70
ER211757	14-R9	ER304290	1-R44	ER342933	4-R101,2	ER357491	1-R9	ER407316	4-R98
ER211757	14-R13	ER304290	1-R48	ER342933	4-R117	ER357491	2-R2	ER407316	4-R116
ER211858	1-R24	ER304290	14-R10	ER342933	4-R145	ER357491	2-R5	ER419040	2-R4
ER211858	1-R33	ER304402	1-R59	ER342933	4-R165	ER357491	4-R12	ER419040	4-R50
ER211858	14-R6	ER304402	4-R139	ER343078	2-R9, 10	ER357491	4-R73	ER419040	4-R107
ER211950	6-R3	ER304402	4-R159	ER343078	4-R135	ER357535	2-R29,30	ER419040	4-R144
ER212016	5-R12	ER304402	5-R5	ER343078	4-R153	ER357535	4-R59	ER419040	4-R164
ER212016	5-R14	ER306843	1-R8	ER343078	4-R173	ER357535	4-R90	ER419556	1-R53
ER212016	5-R16	ER306843	4-R3	ER343135	7-R6	ER357535	4-R132,33	ER419556	4-R39
ER212264	1-R27	ER306843	4-R29	ER345677	3-R111,12	ER357535	5-R10	ER420232	4-R16
ER212264	1-R39	ER306843	4-R63	ER345677	3-R211,12	ER357535	10-R2	ER420232	4-R103
ER212264	4-R1	ER306843	4-R91	ER345712	3-R205,6	ER357535	10-R4	ER420322	4-R99
ER212264	4-R6	ER306843	4-R152	ER345712	3-R263	ER357535	11-R17	ER426857	4-R141
ER212264	4-R32	ER306843	4-R172	ER345712	3-R265	ER357535	18-R2	ER426857	4-R161
ER212264	4-R66	ER306887	1-R3	ER345712	3-R267	ER357570	1-R43	ER427950	3-R209,10
ER212264	4-R94	ER306887	1-R10	ER345712	3-R270	ER357570	4-R19	ER427961	21-22x
ER212264	7-R14,15	ER306887	1-R60	ER345712	3-R311,12	ER357570	4-R28	ER428567	22-63x
ER212477	1-R32	ER306887	4-R2	ER345712	3-R366	ER357570	4-R54	ER429996	14-R4
ER212477	5-R11	ER306887	4-R37	ER345756	3-R113,14	ER357570	4-R62	ER430007	5-R3
ER212477	6-R9,10	ER306887	4-R71	ER345756	3-R254	ER357570	4-R85	ER430020	4-R78

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ER430086	1-R28	ET453611	7-TR3	ZS321298	23-33x				
ER430086	6-R11	ET492827	3-X103	ZS371856	14-4x				
ER430108	4-R147	ET516554	3-X203to6	ZS371856	21-8				
ER430108	4-R167	ET517994	7-TR2	ZS371856	22-13				
ER430143	3-R353,54	ET517994	7-TR5	ZS371856	23-24x				
ER430165	3-R245,46	ET520301	3-X218	ZS379405	5-9x				
ER430165	3-R323,24	ET520334	1-TR1,2	ZS379451	22-46				
ER430211	3-R201,2	ET539122	7-TR4	ZS444240	24-14x				
ER430211	22-64x	ET539987	2-TR4,5	ZS447761	22-42				
ER430233	3-R329,30	ET539987	4-TR1to6	ZS447772	7-3				
ER430255	3-R249,50	ET539987	4-TR9to15	ZS447772	21-9				
ER430255	3-R303,4	ET539987	4-TR18to20	ZS447772	21-25				
ER430288	3-R259	ET539987	5-TR1	ZS447772	22-3x				
ER433877	5-R7	ET539987	6-TR1,2,3	ZS447772	22-15				
ER440921	3-R257	ET539987	11-TR1to4	ZS447772	22-38x				
ER440921	3-R343,44	ET539987	14-TR1,2	ZS447772	23-4				
ER440921	3-R363,64	ET551406	1-T1	ZS447772	24-27x				
ER443790	3-R147,48	ET551564	5-TR2,3	ZS447805	23-11				
ER443790	3-R227,28	ET552870	2-TR1	ZS447805	24-11x				
ER443790	3-R337,38	ET552870	3-X209,10	ZS447840	23-7				
ER443790	3-R505,6	ET556020	5-TR4	ZS447840	24-10x				
ER450101	3-R125,26	ET557954	5-TR5,6	ZS462936	21-19x				
ER450101	3-R203,4	ET557965	4-TR16,17	ZS463454	5-5				
ER450101	3-R237,38	ET557965	4-TR25	ZS530673	23-22x				
ER452542	5-R21	ET557998	7-TR1	ZS530684	21-2				
ER458728	7-R9	ET716951	3-X311,12	ZS552611	22-32				
ER466582	5-R8	ET716962	3-X307,8	ZS552622	22-53				
ER483390	7-R8	EV380215	1-VR1	ZS552622	24-37x				
ER496214	2-R3	EV383398	5-VR1	ZS570385	22-30				
ER496214	2-R6	EV409858	5-VR2	ZW259593	5-7x				
ER497417	7-R10	EV551452	1-VR2	ZW260122	21-17x				
ER512201	2-FL1,2	EV555941	11-VR2,3	ZW270191	15-3				
ER514844	3-R101,2	EV557741	21-14	ZW270191	16-4				
ER514844	3-R503,4	EV557831	13-VR9,10	ZW273778	22-35x				
ER514844	4-R27	EV557842	12-VR8	ZW273802	22-36x				
ER514844	4-R61	EV557897	22-52	ZW273914	22-47x				
ER520852	7-R5	EV557921	11-VR1	ZW274026	23-26x				
ER520852	7-R7	EV557943	22-54	ZW348030	22-48x				
ER539818	1-FL1to3	EV716927	3-VR201,2	ZW348107	5-6x				
ER556042	5-R13	EV716938	3-VR203,4	ZW348107	22-33x				
ER556042	5-R15	EV716940	3-VR205,6	ZW426622	5-11x				
ER556064	5-R17,18	EV716995	3-VR301to4	ZW463410	23-27				
ER556784	1-R61	EW315448	22-59x	ZW465287	22-6x				
ER557796	18-R5	EW486797	22-60x	ZW493312	24-18x				
ER559034	16-R1to4	EW524845	22-58x	ZW548010	24-30				
ER562566	23-14	EW540112	22-57	ZW551373	22-49x				
ER564052	3-R501,2	EZ246936	22-62x	ZW552611	22-29				
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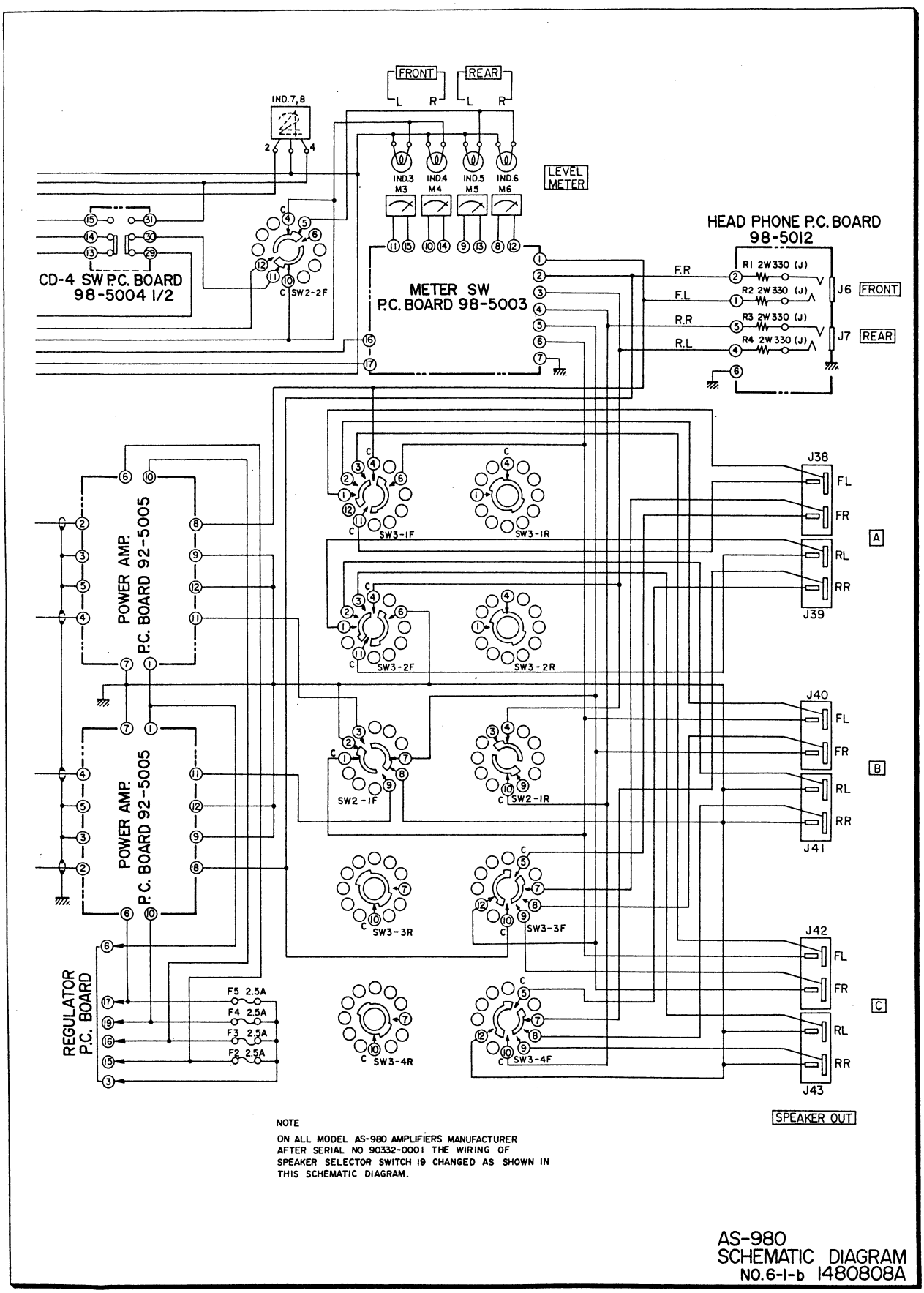
ER717063	3-R155	EZ543003	5-3						
ER717074	3-R154	EZ717107	3-2						
ER717085	3-R151	EZ717118	3-3						
ER717096	3-R153	MR530651	21-4						
ES468448	21-6	MR530662	21-3						
ES513922	2-SW1	MR530662	23-21x						
ES551171	17-SW1,2	MR530706	23-32						
ES557752	21-21	MS530752	21-15						
ES557763	21-23	MZ229138	21-11						
ES557774	19-SW1	MZ229138	23-48						
ES557785	18-SW1	MZ544937	33-40						
ES560283	21-10	SA545005	24-25x						
ES560294	21-12	SC546208	24-2						
ES591107	14-SW2	SK531213	24-13						
ES591118	14-SW1	SK531281	24-21						
ES591120	20-SW18	SK531314	24-15						
ET234854	3-X101,2	SK531347	24-17						
ET234854	3-X301to4	SK531358	24-16						
ET380834	1-TR3to7	SK545016	24-22						
ET380834	3-X211to17	SK545027	24-23						
ET399881	3-X201,2	SK546658	24-20						
ET399881	3-X207,8	SK547964	24-19						
ET399881	3-x305,6	SM531336	22-8x						
ET399881	3-X309,10	SP544948	22-27						
ET427860	1-TR8to11	SP544961	24-24x						
ET453486	2-TR2,3	SP545084	24-1						
ET453486	4-TR7,8	ZG549011	23-34x						
ET453486	4-TR21to24	ZS321298	5-10						

SECTION 3

SCHEMATIC DIAGRAM



NOTE

ON ALL MODEL AS-980 AMPLIFIERS MANUFACTURER AFTER SERIAL NO 90332-0001 THE WIRING OF SPEAKER SELECTOR SWITCH 19 CHANGED AS SHOWN IN THIS SCHEMATIC DIAGRAM.

AS-980
SCHEMATIC DIAGRAM
NO.6-1-b 1480808A

AS-980

NOTE
UNLESS OTHERWISE SPECIFIED
ALL RESISTORS IN Ω 1/4W(J)
ALL CAPACITORS IN μF 50W.V.(J)
RESISTOR R10 1/2W 2.2MΩ IS ONLY USED FOR CSA, AAL(U/L) MODELS.

FM 4CH OUTPUT
SIGNAL
TUNING
FM FRONT END
FM-AM IF P.C. BOARD 94-5009
MPX P.C. BOARD 94-5008
VRY2 1KB MPX ADJ
R9 43K
IND.16 to 25
DIAL IND.9 to 13
IND.7,8
R7 1/2W 0.47
FRONT
REAR
METER SW P.C. BOARD 98-5003
CD-4 SW P.C. BOARD 98-5004 1/2
HEAD PHONE P.C. BOARD 98-5012
SPEAKER OUT
LOUDNESS SW P.C. BOARD 1/2 98-5016
VOLUME CONTROL P.C. BOARD 98-5006
TONE CONTROL P.C. BOARD 98-5007
FILTER & REMOTE SW P.C. BOARD 98-5014 A,B
VRY 250K×4 MAIN BALANCE
RECT. P.C. BOARD (2) 98-5011
POWER AMP. P.C. BOARD 92-5005
EQ AMP. P.C. BOARD 98-5008
SQ AMP. P.C. BOARD 98-5015
REGULATOR P.C. BOARD 98-5084
RECT. P.C. BOARD (1) 98-5010
RESISTOR P.C. BOARD 1/2 98-5060
RESISTOR P.C. BOARD 1/2 98-5060 1/2
TAPE SW P.C. BOARD 98-5002
CD-4 SW P.C. BOARD 1/2 98-5004
CD-4 DEMODULATOR P.C. BOARD TDM-7
CD-4 SEPARATION VOL. P.C. BOARD 98-5005
CD-4 30KHz LEVEL ADJ
CD-4 SEP ADJ
AC OUTLET SWICHED
AC OUTLET UN SWICHED
CSA MODELS
SELECTOR
MODE
SPEAKERS
POWER SELECTOR

MIC IN FRONT
PHONO-1 FRONT
PHONO-2 FRONT
AUX FRONT
REAR
GROUND
DIN CONNECTOR
TAPE-1 FRONT J14 to J17 REC P.B
TAPE-2 FRONT J18 to J21 REC P.B J22,23 REC P.B REAR J27,28
TAPE-3 FRONT J29 to J32 REC P.B REAR J33 to J36
DUB FRONT REAR

AS-980
SCHEMATIC DIAGRAM
NO.6-1 1480802A 2C

AD PHONE P.C. BOARD
98-5012

J38 FL FR RL RR A
J39

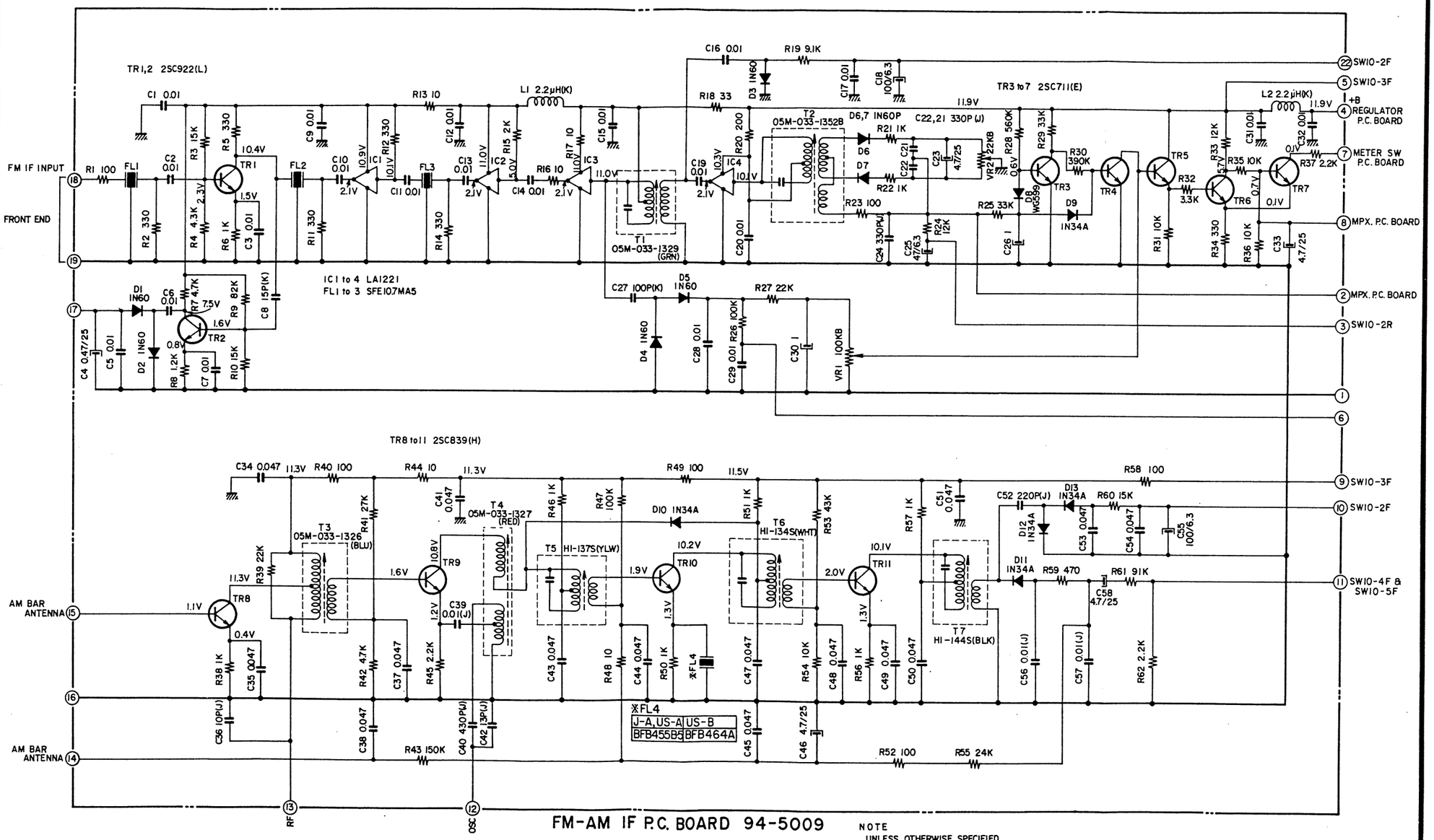
J40 FL FR RL RR B
J41

J42 FL FR RL RR C
J43

SPEAKER OUT

AS-980
SCHEMATIC DIAGRAM
NO.6-1-b 1480808A

AS-980



FM-AM IF P.C. BOARD 94-5009

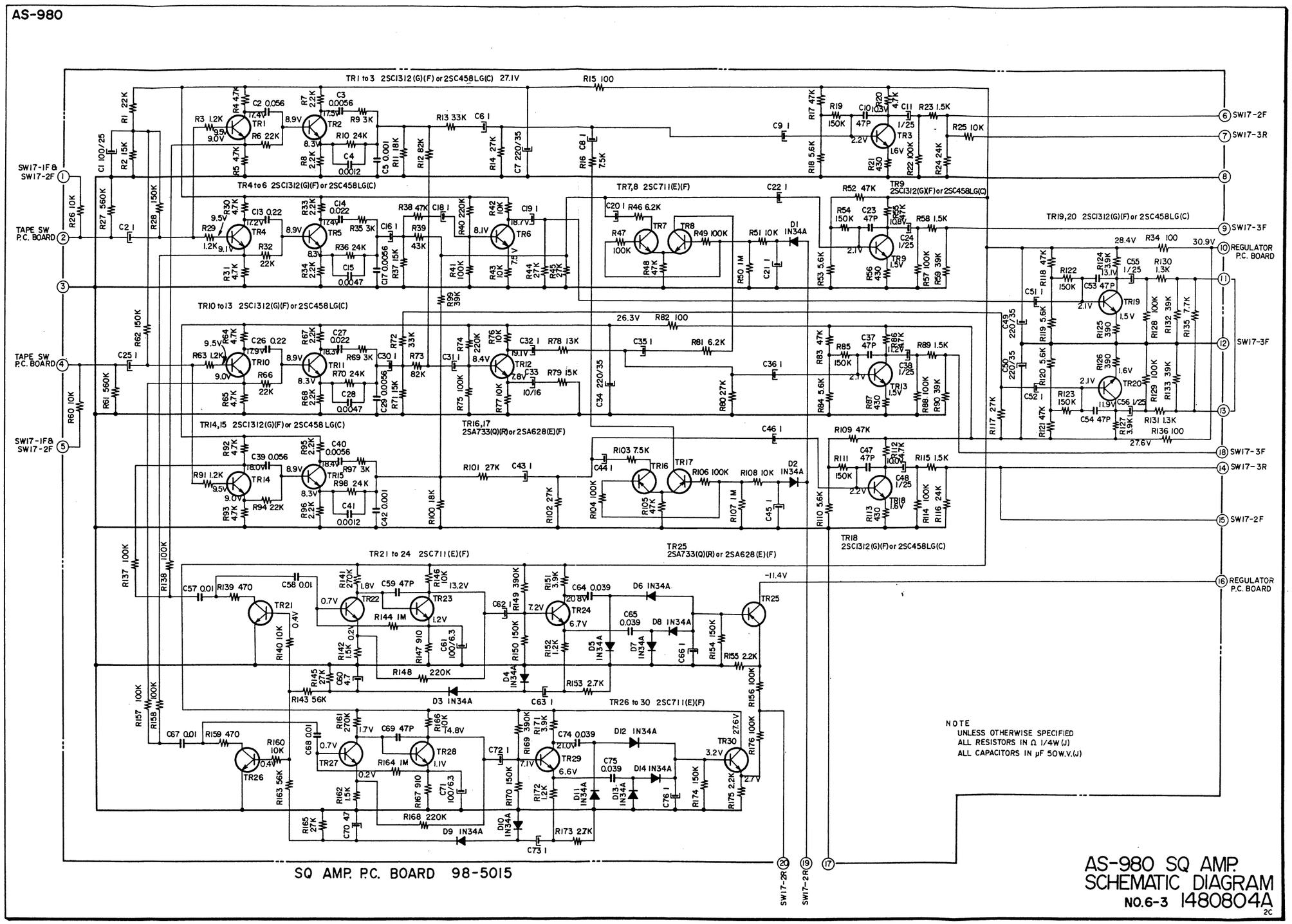
NOTE
UNLESS OTHERWISE SPECIFIED
ALL RESISTORS IN Ω 1/4W(J)
ALL CAPACITORS IN μF 50W.V.(Z)

AS-980 FM-AM IF SCHEMATIC DIAGRAM

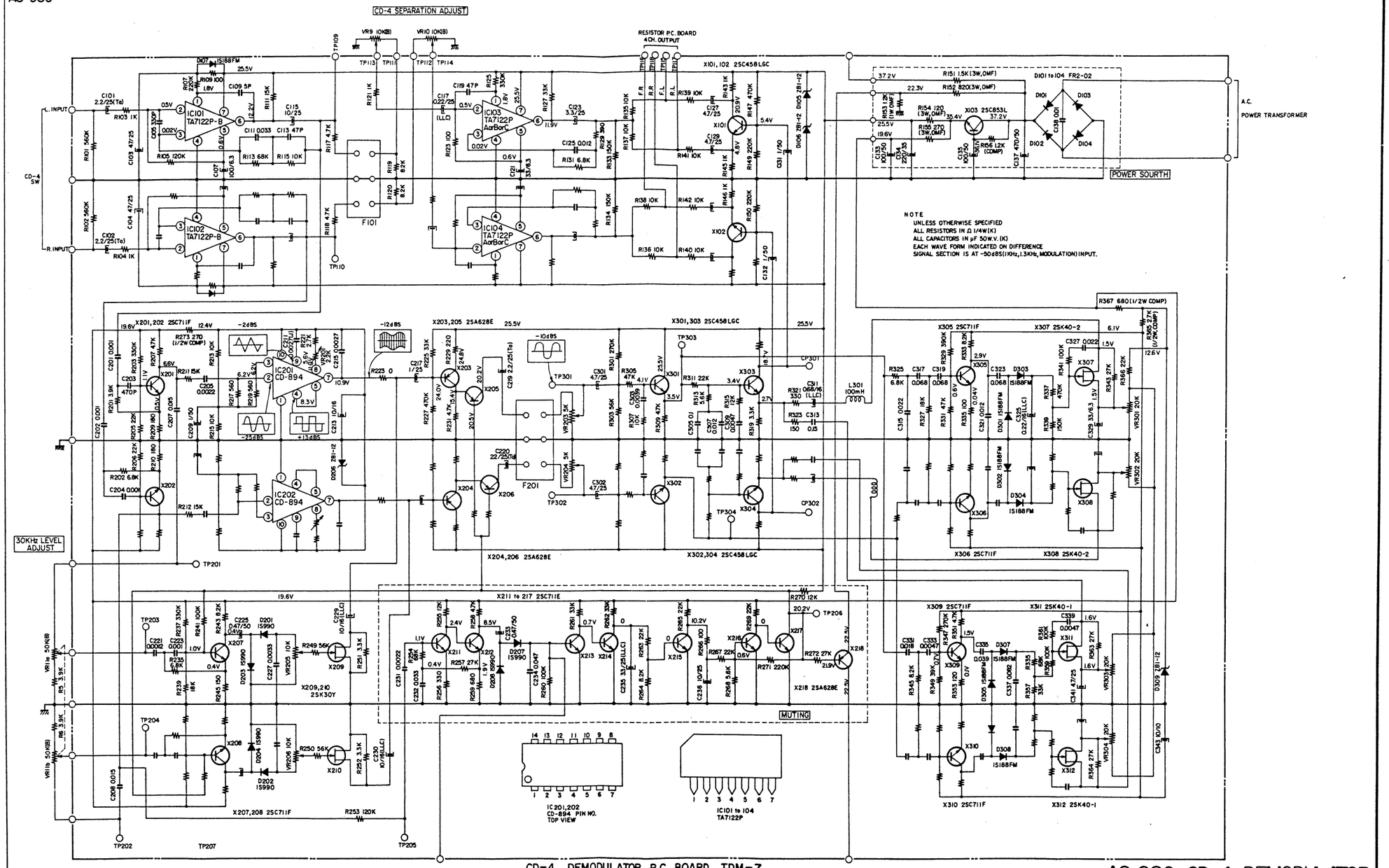
NO.6-4 1480805A

2C

AS-980


TR1 to 3 2SC1312(G)(F) or 2SC458LG(C) 27.1V
TR4 to 6 2SC1312(G)(F) or 2SC458LG(C)
TR7,8 2SC711(E)(F)
TR9 2SC1312(G)(F) or 2SC458LG(C)
TR10 to 13 2SC1312(G)(F) or 2SC458LG(C)
TR14,15 2SC1312(G)(F) or 2SC458LG(C)
TR16,17 2SA733(Q)(R) or 2SA628(E)(F)
TR18 2SC1312(G)(F) or 2SC458LG(C)
TR19,20 2SC1312(G)(F) or 2SC458LG(C)
TR21 to 24 2SC711(E)(F)
TR25 2SA733(Q)(R) or 2SA628(E)(F)
TR26 to 30 2SC711(E)(F)
SW17-1F 8
SW17-2F
TAPE SW P.C. BOARD
SW17-3F
SW17-2R
REGULATOR P.C. BOARD
-11.4V
SQ AMP. P.C. BOARD 98-5015
NOTE
UNLESS OTHERWISE SPECIFIED
ALL RESISTORS IN Ω 1/4W (J)
ALL CAPACITORS IN μF 50W.V.(J)
AS-980 SQ AMP.
SCHEMATIC DIAGRAM
NO.6-3 1480804A
2C

AS-980

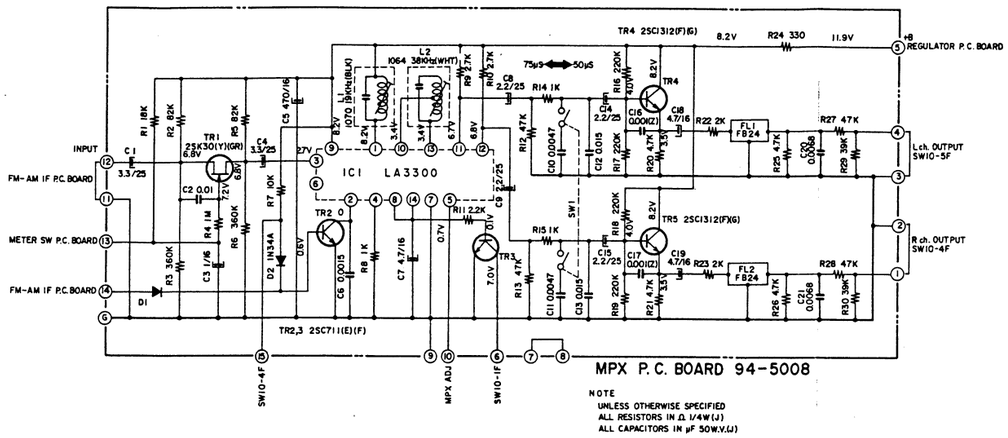


CD-4 DEMODULATOR P.C. BOARD TDM-7

AS-980 CD-4 DEMODULATOR SCHEMATIC DIAGRAM

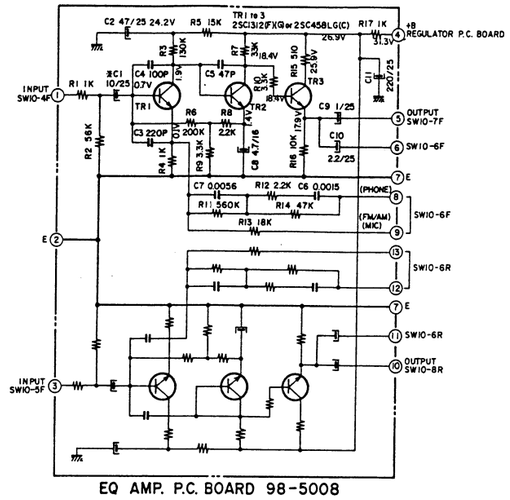
NO.6-2 1480803A 2C

AS-980



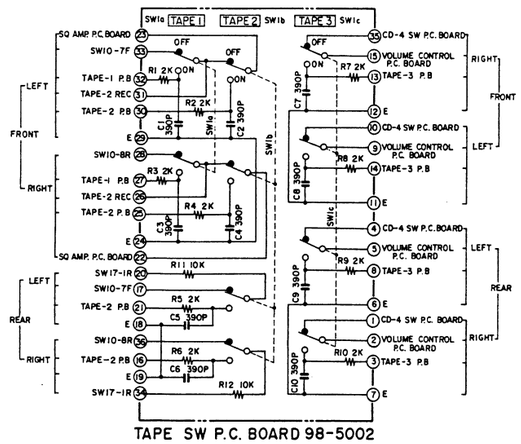
MPX P.C. BOARD 94-5008

NOTE
UNLESS OTHERWISE SPECIFIED
ALL RESISTORS IN Ω 1/4W(J)
ALL CAPACITORS IN μF 50W.V.(J)



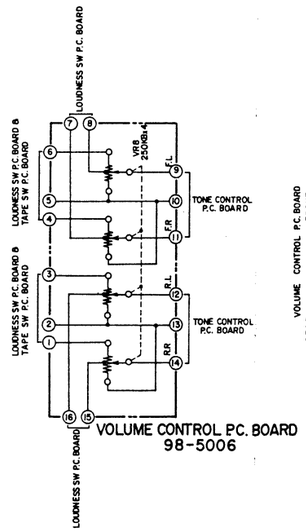
EQ AMP. P.C. BOARD 98-5008

NOTE
UNLESS OTHERWISE SPECIFIED
ALL RESISTORS IN Ω 1/4W(J)
ALL CAPACITORS IN μF 50W.V.(J)
※ MARK INDICATES LOW LEAKAGE CAPACITORS

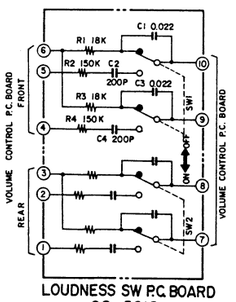


TAPE SW P.C. BOARD 98-5002

NOTE
UNLESS OTHERWISE SPECIFIED
ALL RESISTORS IN Ω 1/4W(J)
ALL CAPACITORS IN μF 50W.V.(J)

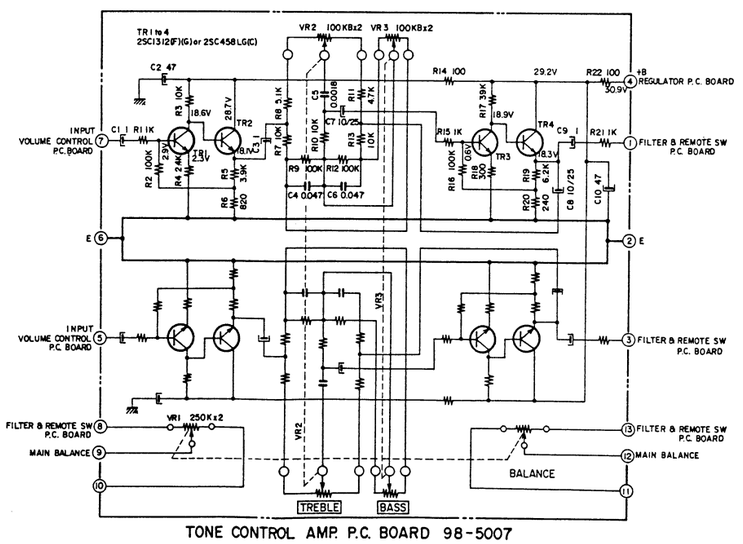


VOLUME CONTROL P.C. BOARD 98-5006



LOUDNESS SW P.C. BOARD 98-5016

NOTE
UNLESS OTHERWISE SPECIFIED
ALL RESISTORS IN Ω 1/4W(J)
ALL CAPACITORS IN μF 50W.V.(J)

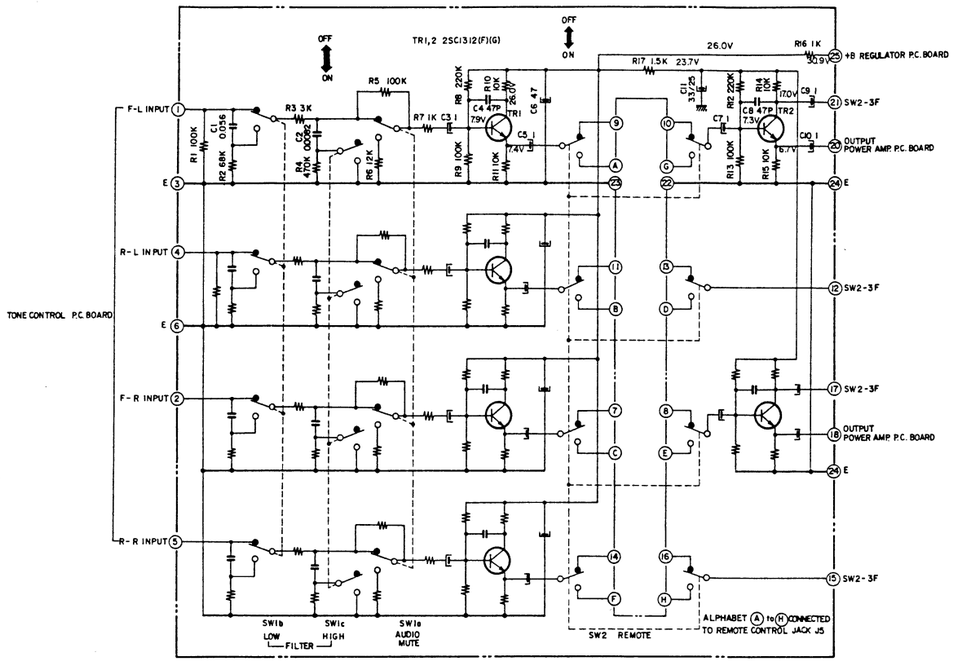


TONE CONTROL AMP. P.C. BOARD 98-5007

NOTE
UNLESS OTHERWISE SPECIFIED
ALL RESISTORS IN Ω 1/4W(J)
ALL CAPACITORS IN μF 50W.V.(J)

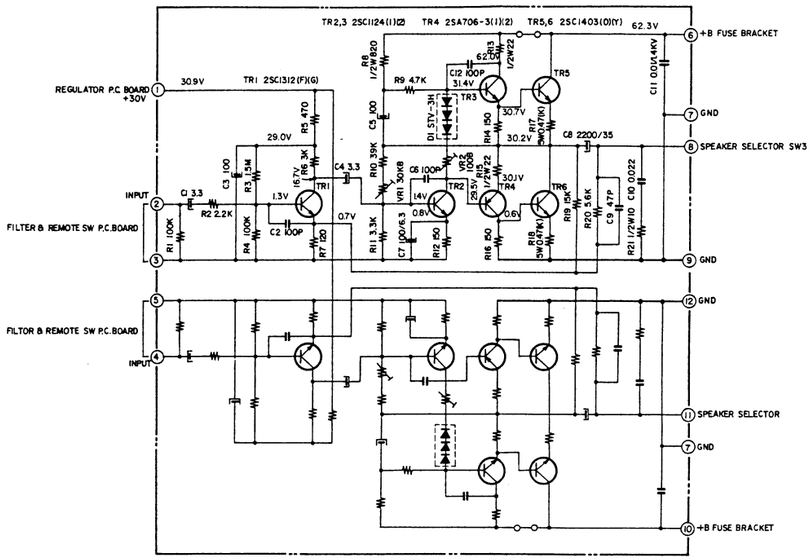
AS-980
SCHEMATIC DIAGRAM
NO.6-5 1480806A
2C

AS-980



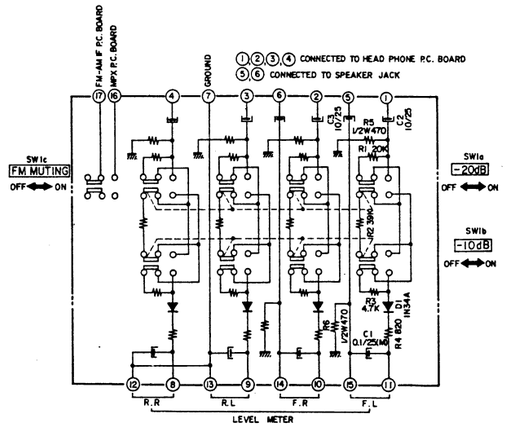
FILTER & REMOTE SW P.C. BOARD 98-5014 A,B

NOTE
UNLESS OTHERWISE SPECIFIED
ALL RESISTORS IN Ω 1/4W(J)
ALL CAPACITORS IN μF 50W.V.(J)



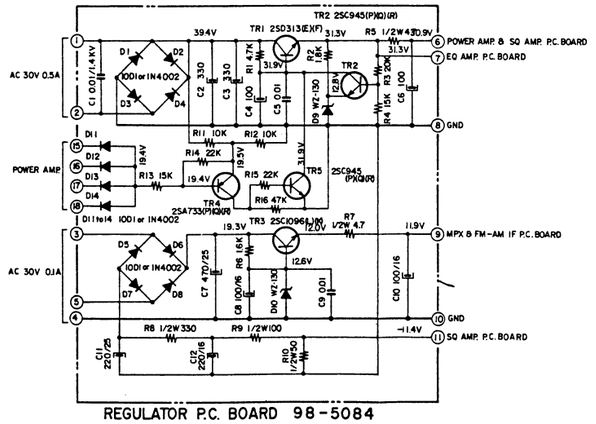
POWER AMP. P.C. BOARD 92-5005

NOTE
UNLESS OTHERWISE SPECIFIED
ALL RESISTORS IN Ω 1/4W(J)
ALL CAPACITORS IN pF 50W.V.(J)



METER SW P.C. BOARD 98-5003

NOTE
UNLESS OTHERWISE SPECIFIED
ALL RESISTORS IN Ω 1/4W(J)
ALL CAPACITORS IN μF 50W.V.(J)



REGULATOR P.C. BOARD 98-5084

NOTE
UNLESS OTHERWISE SPECIFIED
ALL RESISTORS IN Ω 1/4W(J)
ALL CAPACITORS IN μF 50W.V.(J)

AS-980
SCHEMATIC DIAGRAM
NO.6-6 1480807A
2C